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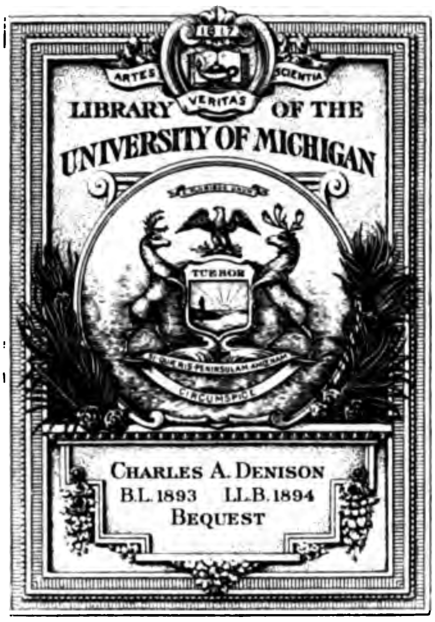

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FASCICULI MALAYENSES

ZOOLOGY

PART I

OCTOBER, 1903

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FASCICULI MALAYENSES

FASCICULI MALAYENSES

ANTHROPOLOGICAL AND ZOOLOGICAL RESULTS OF AN EXPEDITION
TO PERAK AND THE SIAMESE MALAY STATES, 1901-1902

UNDERTAKEN BY
NELSON ANNANDALE AND HERBERT C. ROBINSON
UNDER THE AUSPICES OF THE UNIVERSITY OF EDINBURGH AND
THE UNIVERSITY OF LIVERPOOL

ZOOLOGY

PART I

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MAMMALS

BY

J. LEWIS BONHOTE, M.A., F.Z.S.

MAMMALS

BY

J. LEWIS BONHOTE, M.A., F.Z.S.

INTRODUCTORY NOTE

ALTHOUGH from so rich a region, it will be seen that our collection of mammals embraces only some sixty-four species, of which several are represented by unique specimens. This is, perhaps, to be explained by the fact that I was only able to devote a small proportion of my time to this group, and also because we were not successful in securing the assistance of natives who were good jungle men. From time to time we set a very large number of traps, but found that the animals, when captured, were frequently either removed by small carnivores or else spoilt as specimens by ants. An efficient trap which will capture small mammals alive has, apparently, yet to be invented. In the districts visited by us I have little doubt, from my own observation, that there are a considerable number of small insectivores, shrews and the like, as well as a great variety of rats and mice, which can only be obtained by the merest accident by a collector who is not prepared to spend the great proportion of his time on the group. The Chiropterous fauna, too, must be very extensive, and I may mention that in the limestone caves near Kuala Lumpur I obtained, in one morning, twelve species, including the rare *Eonycteris spelaea*, which number could doubtless be increased by systematic collecting.

I have added to Mr. Bonhote's paper certain field-notes made by Mr. Annandale or myself, which are distinguished by being placed between inverted commas.

A complete set of all species obtained, including the types of new species, has been deposited in the National Collection.

HERBERT C. ROBINSON.

I

REPORT ON THE MAMMALS

By J. LEWIS BONHOTE, M.A., F.Z.S.

THE mammal collection brought home by Messrs. ROBINSON and ANNANDALE has, perhaps, tended more to our knowledge of the fauna of the Malay Peninsula than any other collection from that district which has reached this country of late years. This has not alone been due to the fact that the present material has been procured on the modern system, accurate measurements being taken, and the skulls carefully preserved apart from the skins, but also because during the last four or five years the 'Skeat' Expedition and the collections of Mr. LYLE in Siam proper, as well as large collections received in America from Dr. W. L. ABBOTT, had, while adding many facts, opened up many interesting points, several of which this collection has enabled us to solve. The result is that, although much still remains to be done, the mammalian fauna of the Malayan area is as well, or even better, known than that of any other part of the Oriental region.

The present collection contains some sixty-four species, of which eight are described as new. The connexion between the Malayan and Bornean fauna is shown, apart from species previously noticed as having representative forms in both localities, by the discovery of a cat, closely related to *Felis badia*, and a small squirrel, related to *S. lowii*, which I have named after Mr. ROBINSON. A species of *Rhinolophus* allied to, but quite distinct from, *R. affinis* is described; this species has been known for some time, but was considered as referable to *R. rouxi*, Temm., which, however, is shown not to be the case. It will probably, eventually, be found to occur in Borneo, as Mr. MILLER has already described another form of it from one of the islands in the S. China Sea, under the name *R. spadix*.

Four species of *Mus* are among the novelties; one, *Mus annandalei*, is a very distinct species, especially in its cranial characters, while of the other three two belong to the *Mus rattus* group, and one is allied to *Mus jerdoni*. Owing to the large number of species already described from this part of the world, the working out of these rats necessitated a very careful examination, as far as was possible, of the whole of the rats of the Oriental region, the results of which are incorporated in the present paper, and will, I trust, prove of use to future workers. I must here record my thanks to Mr. Gerritt S. Miller, of the National Museum at Washington, who very kindly sent me over a series of topotypes of several of his recently described species, which have been of the greatest assistance.

Two rare species of bats, whose occurrence on the Peninsula was doubtful, have been procured, viz., *Cynopterus ecaudatus* and *Nycteris javanica*, and also several specimens of Mr. Miller's recently described *Emballonura peninsularis*.

Several fine adult skulls and skins of the porcupine *Hystrix grotei*, Gray, hitherto only known from the type, a young specimen, were brought back. They are apparently of the same species as that recorded by me in the 'Skeat' collection as *H. yunnanensis*, which is probably identical with Gray's species. *Nemorhoedus swettenhami* proves to be a good form distinct from *N. sumatrensis*, and a revision of the *Tragulidae*, partly brought about by the series in this collection, has already been published. In addition to the actual specimens, the collectors have made some very interesting field-notes on the habits and distribution of several species, which will be found under those species to which they refer; among other points, a difference in the habits of *Sciurus vittatus* and *S. nigrovittatus*, which are now proved to be perfectly distinct species, is noted, and a curious difference between the habits of the former species on the East and West Coasts is pointed out. The distribution of species on either side of the Peninsula seems likely to be a matter of considerable interest, but at present our knowledge is too limited for any definite statements to be made; as a rule, the species on either coast appear to be much the same, but their distribution is different; in the case of *Funambulus insignis*, however, the Eastern form differs from that found on the West Coast. It has been found that Linnaeus' name of *cynomolgus*, for the common macaque could no longer stand, as it applies to an African monkey, probably a baboon, and in consequence, Raffles' name of *fascicularis* has been used. Mr. Miller has been followed in the use of the generic name *Presbytes* instead of that of *Semnopithecus*, in accordance with the laws of priority.

It only remains for me to tender my best thanks to Mr. Oldfield Thomas, who has so greatly helped me with his advice and opinion on the difficult points which arose during the writing of this paper.

Hylobates sp. (?)

'We never actually saw a gibbon except doubtfully, at a great distance, on Bukit Besar, but we frequently heard them near Mabek, and judging from the noise they made they must have been very abundant on the hills round the Semangko Pass on the Perak Pahang boundary.'

'In Upper Perak it is believed by the Malays that different species of gibbon inhabit the two banks of the Perak River, and this belief is, to some extent, born out by the cries heard by myself (see *Anthropology*, part I, p. 1). I was surprised to see a gibbon, a white individual (*H. lar*, LINN.), among the mangrove swamps at the mouth of the Trang River; possibly it had escaped from captivity, as in the Malay Peninsula the genus *Hylobates* is usually confined to hilly ground covered with bamboos or dense jungle. The Siamese of Trang believe that all gibbons are females, being the other sex of the lôtong (*Presbytes*), which, they say, is always male.'—N.A.

Macacus nemestrinus (Linn.)

'The "broh" is frequently met with in captivity in the Patani States, but it is doubtful if it occurs wild in the districts we visited. It is often trained, especially by the Siamese, to pluck the nuts from the cocoanut palms, and captive specimens occasionally attain a very large size, but are apt, when full grown, to become morose and savage.

'This monkey is not uncommon near the villages of Upper Perak, and I believe that I have seen at least one troop in South Perak, at Gedong. It is captured in large numbers at Malacca, and is abundant on the outskirts of the town of Singapore, especially in the grounds of a Mahommedan shrine near the Tanjong Pagar docks.'—N.A.

Macacus sp. (?)

'In a patch of jungle, not far from Biserat, I came across a very large species allied to the preceding. I had only a light collecting gun with me and No. 12 shot, so I was unable to secure it, but as it was very leisurely in its movements I had an excellent view of it. In general colour it resembled *M. nemestrinus*, but excelled in size the largest specimen I have seen of that species, and possessed a very marked ruff of almost white hair round its face. The tail was very short, not more than about three inches in length.'

1. **Macacus fascicularis** (Raffles)

Simia fascicularis, *Raffles*, *Trans. Linn. Soc.* XIII, p. 246 (1822).

Macacus cynomolgus (Linn.), *Blyth*, *Cat.* p. 9; *id. Mamm. Birds Burma*, p. 7; *Anderson*, *An. Zool. Res.* p. 73 (1879); *Flower*, *P.Z.S.* 1900, p. 316; *Bonhote*, *loc. cit.* p. 872; *and of authors generally.*

a.	♂.	Patani.	2nd June, 1901.
b.	♀ ad.	Biserat, Jalor.	16th July, 1901.
c, *d.*	♀ ad., ♂ jr.	Biserat, Jalor.	16th July, 1901, and 20th July, 1901.
e.	♂.	State of Nawngchik.	17th September, 1901.
f, *g.*	2 ♂ imm.	Ban Sai Kau (captive spms.).	

This series shows a considerable amount of variation, the male from Nawngchik belonging to the rufous coloured variety (*M. aureus*), which colour is also approached by two specimens from Biserat; the remainder are of various shades, all belonging to the commoner greenish-brown type.

The skull of one of the females from Biserat shows certain conspicuous differences in the teeth, also in the general build of the skull and size of the bullae. It may possibly be specifically distinct, but much more evidence bearing on the point is required before a definite opinion can be pronounced.

For many years this species has been known under the name of *M. cynomolgus* (LINN.), a name which should, unfortunately, no longer be used for it, as it undoubtedly belongs to an African species, probably a baboon. Nor is the name *M. cynomolgus* (BUFFON nec LINN.), as used by BLANFORD, available, as this species, renamed *M. irus* by CUVIER, was founded on what BUFFON considered to be *M. angolensis major*, REY, but which CUVIER shows to be a different species from Senegal, intermediate between the Guenons and Baboons. There is, therefore, no choice but to fall back on RAFFLES' species, which is well described, leaving little doubt as to the animal intended.

'The "kră," "krah," or "kerah," as it is variously called in different parts of the Peninsula, was common in all districts on the East Coast visited by us. It was specially numerous among the mangroves of the tidal creeks near Jambu, and was also not uncommon at Biserat, where specimens were obtained as they came to feed on the young Indian corn in a newly-made jungle clearing. In South Perak, where monkeys of all species are scarce, possibly owing to the presence of a large aboriginal population, we did not meet with it, but it was abundant in the vicinity of Kuala Lumpur, Selangor.

'Contrary to the experience of many naturalists we found the "kra" very wary, more especially upon the sea coast, where it was found impossible to obtain specimens without the expenditure of a quite disproportionate amount of time. It is frequently to be seen upon the ground walking with a peculiar stride and holding the tail parallel to the general line of the body. When the tide is low it often frequents the mud banks in search of crustaceans, etc., retreating to the mangroves when disturbed and chattering defiance at the intruder at a safe distance. The alarm-note is a rattle-like cry, from which the vernacular name is possibly derived. When young they are very commonly captured for pets by the natives, and one or two may generally be seen beneath the houses in almost every village, but it is very rare to see a really adult male in captivity, as they become very vicious on approaching maturity. Younger specimens seem, as a rule, much more ferruginous in colour than the older ones.

'We had three specimens of this species in captivity for some time, all of which had been taken from their mothers when too young to fend for themselves. Our Malays attempted to teach these monkeys, after they had reached a considerable size, to climb trees and bring down fruit, but we were surprised to find that not one of them was able to make the initial leap by means of which a wild "kra" negotiates the bare trunk of a tree below where the branches originate. Once they were lifted to the first branch they seemed thoroughly at home, but they appeared to have no idea how to commence climbing a tree. It is conceivable that this deficiency may have been partly a physical one, due to disuse of the hind limb in captivity, but we see no reason to regard this as being the case, believing rather that the inability was simply due to lack of education on the part of the monkeys, which had never been taught to climb by their parents. If this is so, it is a point of great interest in animal psychology. It may be well to note in the same connexion that we found that while young kittens of *Felis bengalensis* were able to swim perfectly well before their eyes were open, young Malay otters (*Lutra cinerea*), at the same stage, merely floundered about in a quite ineffectual manner when placed in a basin of water, and sank almost immediately.'

Macacus sp. (?)

'We had in our possession, for some months, a female of a species allied to the preceding, which was said to have been captured on the Patani River. Unfortunately, it died and its body was thrown into the river by one of the servants. It appeared to us to differ from the common form in having a much rounder head and a totally different facial expression, which it is difficult to put into words; in addition, it possessed a small crest, which was formed by the hair radiating from a circular whorl on the top of the head, and it was evident that when full grown it would have been a much smaller animal. We were inclined to regard this specimen as a representative of a species taking the place of *M. fascicularis* in the thickly-wooded central region of the Peninsula, very much as *Presbytes femoralis* probably takes the place of *P. obscurus*. Near Bendang Stah we saw several large families in the trees on the banks of the Patani River, that appeared to belong to the same variety as our captive specimen.'

2. Presbytes obscurus[1] (Reid)

Semnopithecus obscurus, *Reid*, *P.Z.S.* 1837, p. 14; *Flower*, *op. cit.* 1900, p. 317; *Bonbote*, *op. cit.* p. 872.

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[1] I have followed Mr. Miller (*Proc. U.S. Nat. Mus.*, XXVI, p. 477 (1903)) in using *Presbytes*, Esch., Kotzebue's Entdeck. Reise, III, p. 196 (1821), instead of the well-known *Semnopithecus*, Cuv. Dents. Mamm., pp. 14, 247 (1825).

a, b, c.	♂, ♀ skl., juv. in alc.	Tanjong Patani.	10th June, 1901.
d-h.	♂, 4 ♀.	Tanjong Patani.	1st October, 1901, 30th September, 1901.
i.	♂ jr.	Ban Sai Kau, Nawngchik.	18th September, 1901.
k.	♂	Tenebong, Jalor.	11th August, 1901.

A very typical series showing no variation. The immature specimen is just losing the first yellow pelage which is only left on the hind-quarters and tail. Over the rest of the body the hairs are of a uniform greyish-black, the light patch on the occiput being hardly distinguishable.

'The lôtong is very generally distributed over those parts of the Peninsula that we visited, with the exception of South Perak. Near Biserat it was very abundant on the craggy limestone hills in the vicinity, where it was practically inaccessible, but it never approached the village. Among the casuarinas on Tanjong Patani it was abundant and tame, keeping in troops of one old male with five or six females and young ; these old males are said by the natives to be frequently very savage and even to attack small children. In habits it is much more arboreal than the "kră," and we never saw one of them on the ground. Judging from two specimens obtained the young must be born about February or March (at the end of the stormy season), and until they are about one-third grown are of a beautiful golden-yellow colour, with fur of a soft and silky texture.

'When driven on to an isolated tree these monkeys would ascend the trunk as high as they could, and then strive to conceal themselves by pressing their bodies as closely as possible against the trunk or some large branch, under which circumstances it was very difficult to make them out exactly. At Tanjong Patani the food of those specimens which we examined had consisted entirely of the young shoots of the casuarina.

'A curious change has taken place in the habits of this species at Biserat within the last two years. When ANNANDALE was there in 1899 as a member of the 'Skeat' Expedition, it was common among the fruit trees of the village, into which one or more families came down from the hills nearly every day. The natives deny that it ever does so now. The reason for the change is probably that the houses of Biserat have recently been separated from one another by a broad roadway. Possibly also the large numbers of Siamese and Chinamen now settled there may have something to do with the disappearance of the lôtong from the village, for these two races, unlike the Malays, eat the flesh of the monkey, believing that it has strong tonic qualities, especially for pregnant women. We noticed that while *P. obscurus* was extremely wary in the interior, it was comparatively tame in the neighbourhood of the purely Malay fishing villages on the coast.'

3. **Presbytes femoralis** (Martin)

Semnopithecus femoralis, *Martin*, *Charlesworth's Mag. N.H.* ii, p. 436 (1838); *Flower*, *P.Z.S.* 1900, p. 318.
Semnopithecus siamensis, *Müller and Schlegel*, *Verhandl*, p. 60 (1841); *Anderson*, *An. Zool. Res.*, p. 37 (1879).

a. ♀ imm. Mabek, Jalor. 27th July, 1901.

There can be no doubt that this specimen belongs to the same species as that referred to in the description of *S. femoralis*. As to whether *S. femoralis* and *S. albocinereus* are one and the same species or not is a matter which cannot at present be satisfactorily settled. The typical *femoralis* is quite distinct from the typical *albocinereus*, but apparently intermediate forms may occur.

S. siamensis of MULLER should apparently stand as a synonym of *S. femoralis*, and according to the original description, MULLER's type was a dark coloured monkey and not 'clear ashy grey' as stated by ANDERSON. The original type locality of *S. femoralis* is Sumatra, so that further series may well prove it to be distinct from *siamensis*.

'I know nothing of this species except that it probably replaces the foregoing in the denser jungle towards the centre of the Peninsula, where it appears to be well known to the natives under the name of 'kaka.' It is extraordinarily agile and shy, and the one troop that we saw kept to the tops of the loftier trees in a patch of thick jungle near Mabek. *Semnopitheci* were very abundant, but I think that all that we saw between Mabek and Biserat belonged to *S. obscurus*.'

Presbytes sp. (?)

On Bukit Besar ANNANDALE saw a large brown monkey with an entirely black face and a very long tail; it was not improbably *S. maurus*.

4. **Nycticebus tardigradus** (Linn.)

Lemur tardigradus, *Linn. Syst. Nat.* 1, p. 44 (1766).
Nycticebus tardigradus (LINN.), *Blanf. Faun. Brit. Ind.*, *Mamm.*, p. 45 (1888); *Flower*, *P.Z.S.* 1900, p. 321; *Bonhote*, *op. cit.* p. 873.

a. ♂ ad. Jambu, Jhering. 7th June, 1901.
b. ♀ ad. Biserat, Jalor. 18th October, 1901.

Both these individuals belong to the variety described by Mr. BLANFORD as *N. bengalensis* (GEOFFR.)

'In Perak and Selangor this species is known as 'kongkang,' in the East Coast States of Patani and Jalor as 'nilong,' and in Jalor also as 'kră duku.' Around it many native superstitions centre, and the presence of a specimen on a fishing boat is believed to ensure a favourable wind. We never met with the species ourselves, the specimens in the collection having been brought in by the natives.'

5. **Felis pardus**, Linn.

Felis pardus, *Linn. Syst. Nat.* 1, p. 61 (1766); *Flower, P.Z.S.* 1900, p. 323.

a. Skull. Tanjong Luar, Borders of Rhaman and Jalor. November, 1901.

6. **Felis** sp. (?)

There is a single specimen of a young cat from Ban Sai Kau on the 21st May, 1901. The whole of the upper parts are of a dull rusty-red, the under parts white, spotted with black. Although it is impossible to make a definite statement on this single immature individual, it appears to belong to a species most nearly allied to *Felis badia* of Borneo, of which it is possibly the mainland form.

'The specimen commented on above was brought to us by the natives and kept alive for some days. It was of a very savage disposition, and escaping from its cage was killed in process of recapture. The species appears to be well-known to the villagers of the neighbourhood of Bukit Besar, who describe the adult as being of a uniform bright red, and in size "as big as a dog." The smaller jungle cats are known collectively as "rimau akar"—creeper cats.'

Felis bengalensis, Kerr

'We obtained three kittens only a few days old at Kampong Jalor, which may probably be referred to this species.'

7. **Viverra zibetha**, Linn.

Viverra zibetha, *Linn. Syst. Nat.* 1, p. 65 (1766); *Flower, P.Z.S.* 1900, p. 327; *Bonhote, op. cit.* p. 873.

a. ♀ imm. Kampong Jalor. 28th October, 1901.

Precisely similar to the specimen brought home by the 'Skeat' Expedition, and described in my paper quoted above.

There are also three specimens of a very young *Viverra*, procured at Mabek, on the 28th July, 1901, which I would also refer to this species.

They are of a uniform dark-brown colour, and the tail is indistinctly ringed with white, which is most easily seen on the under surface. The large white mark across the throat is plain and conspicuous, but the other two light transverse bands are only faintly visible. The anterior one is dull but uniform in colour, while the posterior one is pure white but somewhat irregular and broken up. The under parts are slightly lighter in tone at the bases of the limbs. Above, the hair on the anterior surface of the ear is conspicuously lighter, but, apart from this, no other markings are easily seen. By close inspection, however, the light markings on the side of the neck may be made out and also traces of light markings on the flanks.

8. **Viverricula malaccensis** (Gmel.)

Viverra malaccensis (Gmel.), *Linn. Syst. Nat.* 1, p. 92 (1788).
Viverricula malaccensis (Gmel.), *Flower, P.Z.S.* 1900, p. 328.

♂ ad. skull. Patani. 15th June, 1901.

'The above specimen, which was brought to us in too decomposed a state to preserve the skin, was greyish-brown in coloration, with black lateral stripes and ill-defined side stripes on the belly. Tail with greyish-brown and white bands and a broad white tip, the white bands broader than the others.

The vernacular name is *musang bulan* (moon civet), and immature specimens are very frequently seen in captivity, becoming very tame and following their owners about the village.'

9. **Paradoxurus minor** sp. nov.

General appearance of *P. niger*, but only half the size. Colour above, pale fulvous, showing on the back five longitudinal black stripes, of which the two outer ones tend to break up into spots. These stripes converge anteriorly to form one broad black stripe, which arises from the crown of the head, slightly anterior to the ears. Across the forehead the hairs have white tips, giving it a grizzled appearance, while the muzzle, limbs, and under part of the throat are very dark brown. There is a small white crescent below, and slightly anterior to the eye, and a few irregular white spots on the chin. The remainder of the under parts are of a dull brownish-grey, while the flanks show a few irregular black spots. The tail is black throughout its length, with the exception of the terminal three or four inches which are of a dirty white. The hairs throughout the tail have light coloured bases which are most conspicuous at its roots, while the light hairs on the body have dark ash-coloured bases.

The skull, which, except for its size is that of a typical paradoxure, most nearly resembles one marked *P. typus* in the National Collection. The edge of the bony palate is hardly posterior to the posterior angle of the last molar. The audital bullae are placed wide apart and are more rounded on the inferior surface. In other respects, however, the skull hardly differs from that of most species of the genus.

Dimensions (measured in the flesh). Head and body, 450 mm.; Tail, 460 mm.; Hind foot, 64 mm.; Ear, 39 mm.

Skull. Greatest length, 96 mm.; Length of palate, from 43 mm.; Zygomatic breadth, 53 mm.; Breadth of palate, between canines, 10 mm.; Between inner roots of carnassials, 14 mm.; Greatest width of brain-case, 32 mm.

Habitat. State of Jalor (Kampong Jalor), Malay Peninsula.

Type. ♀ adult, collected on the 3rd November, 1901, by Messrs. H. C. ROBINSON and N. ANNANDALE.

The small size of this paradoxure will be quite sufficient to enable it to be at once distinguished from any of the other species known to inhabit the Peninsula. There is a second skull that agrees with that of the type in all respects.

10. **Paradoxurus hermaphroditus,** Schreb.

Paradoxurus hermaphroditus, *Schreb. Sauge*, p. 346 (1778); *Flower*, *P.Z.S.* 1900, p. 329; *Bonhote*, *op. cit.* p. 873.

a.	♀ ad.	Kampong Jalor.	13th November, 1901.
b.	♀ imm.	Kampong Jalor.	29th October, 1901.

In both of these examples the ground colour is very light, and the three dark dorsal stripes clearly cut and well marked.

11. **Paradoxurus** sp. (?)

a.	♂ juv.	Near Ban Sai Kau, Nawngchik.	12th September, 1901.

The above specimen, which is very young, is uniform brownish-grey throughout, except for the head and face which are whitish, especially that portion immediately anterior to the ears. The two fore feet and tail are also white; the ears and a small patch over the anterior half of the eye, dark brown. I am not able, from the material available, to make out its specific identity.

'This specimen was found by our Malays in a nest in a hollow tree, and was said to be the young of a species of which the vernacular name is *Musang tagalung*, and which lives largely on fish. In appearance it closely resembles a specimen associated with an adult *Paradoxurus leucomystax* in the Selangor State Museum, Kuala Lumpur.'

12. **Putorius nudipes**, F. Cuv.

Putorius nudipes, *F. Cuv. Mamm.* III, p. 149 (1823); *Flower*, *P.Z.S.* 1900, p. 334.

a. ♂. Kuala Lumpur, Selangor. April, 1902.

13. **Lutra cinerea**, Illiger

Lutra cinerea, *Illiger*, *Abh. Akad. Berl.* 1811, p. 99; *Flower*, *P.Z.S.* 1900, p. 334; *Bonbote*, *op. cit.* p. 874.

a. ♀.	ad.	Ban Sai Kau, Nawngchik.	25th May, 1901.
b. ♀.	imm.	Biserat, Jalor.	13th July, 1901.

Measurements in flesh of the adult:—Head and body, 445 mm.; Tail, 273 mm.; Hind foot, 85 mm.; Ear, 10 mm.

'Otters, probably of more than one species, are common in the Patani States, both high up the rivers, in estuarine waters, and even in Patani Bay, the coast form attaining a very large size. The people of the fishing village of Tanjong Budi, on Patani Bay, told us that the species was polygamous, and that the old dog otter always endeavoured to destroy the male pups, the usual number of a litter being four. It was very abundant in this locality, and was often to be seen along the edge of the mangroves at low tide, or swimming in the waters of the bay. Travelling down the Patani River, above Biserat, in very rainy weather, we surprised a party of four on a shingle bank, who sat up on their hind legs and watched us, rubbing their faces with their paws. Native name, *Brang brang*, or *Anjing ayer* (water dog).'

14. **Ursus malayanus**, Raffles

Ursus malayanus, *Raffles*, *Trans. Linn. Soc.* XIII, p. 254 (1822); *Flower*, *P.Z.S.* 1900, p. 335.

One skin (purchased from natives). Ban Sai Kau, Nawngchik.

'From what we heard the sun-bear was by no means uncommon on the slopes of Bukit Besar, and, on one or two occasions, we came upon fallen tree trunks which had been pulled to pieces in the search for honey and grubs. The species has usually the reputation of being harmless and inoffensive, but in the Patani States, at any rate, it is considered "more wicked than the tiger."'

'In the mountains of South Perak we obtained, through the Sakais, the skull and bones of a very old male, which seems to have attained an exceptional size, but from native testimony (and Malays have a keen zoological instinct) it seems very probable that another species remains to be discovered in the Peninsula, which is perfectly well-known to the natives as the 'bruang bukit' (mountain bear),[1] and which lacks the yellowish-white on muzzle, paws, and breast, which is so characteristic a feature in *Ursus malayanus.*

'By some Malay systematists *Nycticebus* is considered a bear, just as for some occult reason the gibbons are classed as squirrels.'

Cyon rutilans, S. Müll.

'Near Jarum, in the north-west of Rhaman, I disturbed a pack of either five or six hunting dogs, which were resting at mid-day under a large tree, in the centre of an open space overgrown with long grass, and surrounded with thick jungle. The dogs walked off quite slowly into the jungle, at a distance of not more than thirty yards in front of me, and, as I heard from a man who followed me, returned very shortly to continue their siesta under the tree. They were absolutely silent, a fact on which my Malay followers congratulated themselves, it being considered most unlucky, in fact, a certain omen of death, to meet the *srîgâla* (as the Malays call it), if it barks. So far as I could see, the body, head, and limbs of the individuals of this pack were of an almost uniform bright rufous, the hair being rather longer than that of the Malay pariah, but closely resembling that of the Sakai domestic dog; while the tail, which was carried hanging down, was almost entirely black and moderately bushy. The head was held erect, and the animals walked high on their feet. The Malays of Rhaman state that there are two species of *srîgâla* not uncommon in the Jarum district, the larger and redder species—that which I saw—being called *srîgâla bukit* (mountain jackal), and not venturing near the villages, though it always goes about in packs; while the smaller variety, which may very well be a true jackal, goes solitary or in pairs, and frequently steals sickly lambs, kids, or calves. In Nawngchik and Jalor the same two species are said by the natives to occur, coming down in early spring into the plains near the villages.'—N. A.

'On Bukit Besar, on a bright moonlight night at the end of April, we were disturbed, towards dawn, by a hideous yelping and yelling, probably produced by a large pack of hunting dogs. It passed along close to our hut and then came to a standstill, continuing for some time, some distance away in the jungle; and on several succeeding occasions we heard the sound about the same time of night, or rather early morning. The Malays hold the same belief with regard to the urine of the *srígâla* as that held by the Ghonds and other Indian tribes regarding that of the dhole (*Cyon rutilans*), *viz.*, that it causes blindness, and that the dogs make use of this quality by urinating against the trunks of trees on which their prey is likely to rub itself.'

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[1] In Hulu Rhaman this hypothetical bear, without the pale markings on the breast, but with spectacled eyes, is known as *bruang anjing* (dog bear) as distinct from the common species, *bruang orang* (man bear), which it is said to exceed in size.—N. A.

15. **Tupaia belangeri** (Wagn.)

Cladobates belangeri, *Wagner*, *Schreb. Saugth. Suppl.* II, p. 42 (1841).
Tupaia belangeri (Wagner), *Bonhote*, *P.Z.S.* 1900, p. 192.

a. ♀ ad. Biserat, Jalor. 4th July, 1901.

T. ferruginea is the southern form of this species and, judging by recent collections, it does not appear to go very far north.

16. **Tupaia malaccana,** Anders.

Tupaia malaccana, *Anders. Zool. Res. Yunnan.*, p. 134 (1879).
Tupaia javanica, Horsf., *Flower*, *P.Z.S.* 1900, p. 336.

a. ♂ ad. Telôm, Perak-Pahang boundary, alt. 4000'. 25th January, 1902.

17. **Orocidura murina** (Linn.)

Sorex murinus, *Linn. Syst. Nat.* I, p. 74 (1766).
Crocidura murina (Linn.), *Flower*, *P.Z.S.* 1900, p. 337 ; *Bonhote*, *loc. cit.* p. 874.

a. ♀ ad. Alor Stah, Kedah. 17th December, 1901.

Although perfectly adult this is a small specimen, being about the same size as the one noted by BLANFORD (Faun. Brit. Ind. Mamm., p. 235 (1888)). The measurements in the flesh were as follows :—Head and body, 97 mm. ; Tail, 55 mm. ; Hind foot, 18 mm. ; Ear, 8 mm.

'It is probable that this musk shrew is an introduction into the Peninsula, and not an indigene. We never met with it in the Patani States, though it is not a mammal that is likely to escape notice, and if it occurs at all it must be decidedly rare and local. On the other hand, it was extremely common at Kuala Lumpur, where I saw several specimens which were captured under the houses, and it is well-known both in Penang and Singapore. The specimen in the collection was captured by one of our men on the curb of a well in the early morning ; it appeared to be quite blind, as it actually ran over his foot. The eyes were very small and almost unpigmented.'

18. Crocidura fuliginosa (Blyth)

Sorex fuliginosus, *Blyth, J. A. S. B.* xxiv, p. 362 (1856).

1 ♀ spm. in alc. Biserat, Jalor. 19th July, 1901.

Measurements in the flesh:—Head and body, 74 mm.; Tail, 63·5 mm.; Hind foot, 15 mm.; Ear, 9 mm.

'The single specimen obtained was found caught by the tail in one of our rat traps, near the entrance of a limestone cave in fairly thick jungle.'

19. Pteropus vampyrus (Linn.)

Vespertilio vampyrus, *Linn. Syst. Nat.* 1, p. 31 (1758).
Pteropus edulis (Geoffr.), *Flower, P.Z.S.* 1900, p. 339.
Pteropus vampyrus (Linn.), *Bonhote, P.Z.S.* 1900, p. 875.

a.	♀ ad.	Patani.	15th June, 1901.
b-e.	♀ ad.	Biserat, Jalor.	July, 1901
f.	♂.	Kampong Bayu, nr. Biserat.	9th July, 1901.

'This big fruit bat, or *kluang*, the largest of all the Chiroptera, is very common in every locality in the Peninsula visited by us. Just before sunset, especially in the fruit season, flights of them are to be seen making their way to the nearest orchard, where they commit great depredations. The line of flight is very direct and usually at a great height, and appears curiously deliberate and raven-like, though the pace at which they travel is really considerable. We noticed them in immense numbers in the estuary of the Klang River, and they were also very numerous on Bukit Besar during our second visit in September, 1901. Some Siamese eat them readily, though no Malay would touch them.'

20. Cynopterus sphinx (Vahl)

Vespertilio sphinx, *Vahl, Scrivten af Naturhistorie-Selskabet* 4te Bind, 1ste Heft p. 123 (1797).
Cynopterus marginatus (Geoffr.), *Flower, P.Z.S.* 1900, p. 349; *Bonhote, loc. cit.* p. 875.

♀.	Patani.	17th June, 1901.
2 ♀.	Biserat, Jalor.	7th July, 1901.

Several specimens in alcohol from Biserat and from the Batang Padang district, South Perak.

'Very common in the houses wherever we went. The specimen from Patani was shot hanging to the under surface of the mid-rib of a cocoanut palm.'

21. Cynopterus ecaudatus (Temm.)

Pachysoma ecaudatum, *Temm. Mon. Mamm.* II, p. 94 (1839).
Megaera ecaudata, *Temm. Mon. Mamm.* II, p. 359 (1841).
Megaerops ecaudatus (Temm.), *Matschie, Megachir. Berl. Museum*, p. 79 (1899).
Cynopterus ecaudatus (Temm.), *Dobs. Cat. Chir. Brit. Mus.* p. 87 (1878).

a. ♀ ad. in alc. Bidor, South Perak. January, 1902.

Véry few specimens of this rare bat have hitherto been obtained. The type was procured at Padang, Sumatra, and the remaining few examples known (with the exception of the present one) have all come from Borneo. This species differs from the other members of the genus Cynopterus by having only two incisors in the lower jaw.

Measurements of the above specimen:—Head and body, 78 mm.; Forearm, 53 mm.

The total absence of the tail, the long nostrils, short muzzle, and presence of but two incisors in the lower jaw, enable this species to be easily recognized.

'Shot under the eaves of the rest-house, Bidor.'

22. Macroglossus minimus (Geoffr.)

Pteropus minimus, *Geoffr.*, *Ann. Mus.* XV, p. 97 (1810).
Carponycteris minima (Geoffr.), *Flower*, *P.Z.S.* 1900, p. 341.
Kiodotus minimus (Geoffr.), *Bonhote*, *P.Z.S.* 1900, p. 875.

a. ♀ ad. Patani. 22nd April, 1901.

23. Rhinolophus affinis, Horsf.

Rhinolophus affinis, *Horsfield*, *Zool. Res.* Java (1824); *Miller*, *Proc. Acad. Nat. Sci. Philad.* 1898, p. 319; *Flower*, *P.Z.S.* 1900, p. 342.

1 spm. in alc. Biserat, Jalor. 16th July, 1901.

The forearm of this specimen measures exactly 50 mm.

24. Rhinolophus malayanus, sp. nov.

Nearly allied to *R. affinis*, Horsf., but much smaller, only slightly exceeding *R. minor*, Horsf., in size.

Ears sharply pointed, and when laid forward reach to the extremity of the muzzle. The outer margin is concave immediately below the tip, and then slightly convex and separated from a large antitragus by a deep notch.

The horseshoe, which is moderately broad and sharply cleft in front, is large enough just to conceal the nostril anteriorly. Sella of moderate width, the erect transverse portion being of equal width throughout its length and slightly narrower than the horizontal part. The connecting process behind the sella hardly rises above the vertical part of the same and is rounded off. The posterior leaf is of moderate size, the tip elongate, and the margins slightly concave. Lower lip with three vertical grooves. Wing membranes from the ankles ; interfemoral membrane nearly straight ; only the extreme tip of the tail projects.

Fur moderately long, sepia brown above, lighter beneath.

Dimensions of type :—Head and body, 46 mm. ; Tail, 20 mm. ; Forearm, 41 mm. ; Ear (from base of antitragus to tip), 14 mm. ; Tibia, 16 mm. ; Greatest width of horseshoe, 8 mm. ; Length from tip of posterior leaf to anterior edge of horseshoe, 13 mm. ; Total expanse, 227 mm.

Habitat. Biserat, Jalor.

Type. Adult female in spirit collected on the 8th August, 1901.

There are some specimens in the British Museum collected by Signor L. FEA in the Karin Hills, Burmah, and recorded by THOMAS,[1] under the name *R. affinis rouxi*[2] (TEMM.) These specimens, though slightly larger and somewhat more rufous in body colour, belong undoubtedly to the species just described, or are, at most, only subspecifically distinct. As regards the name *rouxi*, TEMMINCK states that it is a bat similar in all respects to *R. affinis*, and gives the length of the forearm as '1 pouce, 10 lignes,' or 50 mm. HORSEFIELD's type from Java has a forearm of 49·5 mm. ; there can, therefore, be little doubt that TEMMINCK's *rouxi* is a synonym of *affinis*.

The present species may be at once distinguished from *R. affinis* by its smaller size, and from *R. minor* by the shape of the connecting process between the sella and the posterior leaf, which, in this latter species, ends in a point well above the vertical portion of the sella.

Rhinolophus spadix, Mill. (Proc. Wash. Acad. Sci. III, p. 136 (1901)) from Sirhassen Id. is closely allied to this species.

25. Rhinolophus minor, Horsf.

Rhinolophus minor, *Horsfield*, *Zool. Res. Java* (1824) ; *Flower*, *P Z.S.* 1900, p. 342.

2 spms. in alc. Biserat, Jalor. 8th August, 1901.

26. Hipposiderus armiger, (Hodgs.)

Rhinolophus armiger, *Hodgson*, *J. A. S. B.* IV, p. 699 (1835).

Hipposiderus armiger (*Hodgs.*), *Flower*, *P.Z.S.* 1900, p. 342 ; *Bonhote*, *loc. cit.*, p. 875.

a. ad. Biserat, Jalor.

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[1] Thomas, *Viaggio di Leonardo Fea*, p. 15, Genoa, 1892.

[2] Temminck, *Mon. Mamm.* II, p. 306 (1835).

27. **Hipposiderus larvatus** (Horsf.)

Rhinolophus larvatus, *Horsfield, Zool. Res. Java* (1824).
Hipposiderus larvatus (Horsf.), *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 319 ; *Flower, P.Z.S.* 1900, p. 343.

1 spm. in alc. Biserat, Jalor. 10th August, 1901.

28. **Hipposiderus bicolor** (Temm.)

Rhinolophus bicolor, *Temminck, Mon. Mamm.* II, p. 18 (1835-41).
Hipposiderus bicolor (Temm.), *Flower, P.Z.S.* 1900, p. 343.

4 spms. in alc. Biserat, Jalor. 10th August, 1901.

29. **Nycteris javanica,** Dobs.

Nycteris javanica, *Dobs. Mon. As. Chir.*, p. 81 (1876) ; *id. Cat. Chir. Brit. Mus.*, p. 164 (1878) ; *Flower, P.Z.S.* 1900, p. 345.

1 spm. in alc., imm. Biserat, Jalor. August, 1901.

The occurrence of this specimen confirms Blyth's statement that the species is found in the Peninsula.

30. **Scotophilus castaneus**[1] (Horsf.)

Nycticejus castaneus, *Horsf. Cat. Mamm. E. Ind. Coll.*, p. 38 (1851).
Scotophilus castaneus (Horsf.), *Bonhote, P.Z.S.* 1900, p. 192.

a, b. 2 ♀.	Patani.	22nd April, 1901.
c, d. 2 imm.	Patani.	2nd June, 1901.
10 spms. in alc.	Biserat, Jalor.	June, 1901.

I have previously noted the differences between the present species and *S. kuhli*, and this series entirely bears out my former notes. As regards coloration, it is not strictly accurate to state that the under parts are not lighter, for although, as a rule, the colour is very uniform, some specimens are decidedly paler below. The general colour also varies from smoky-brown to bright chestnut.

I can find no description of this bat by Gray, and it is certainly not in the 'Illustrations of Indian Zoology,' which has been quoted by several authors as containing the original description of the species. It is very closely allied to, if indeed it be not identical with, *S. temminckii* (Horsf.) from Java, but owing to paucity of material the matter cannot be decided at present.

'We found this bat to be the common house bat of the Eastern Malay States. It was exceedingly abundant in the roofs of the houses at Patani, and the specimens from Biserat were obtained in the hollow of the flagstaff facing the government offices.'

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[1] For an account of the parasites, taken on this and other bats, see Dr. Speiser's subsequent paper on the Diptera Pupipara.

31. Myotis muricola (Gray)

Vespertilio muricola, *Gray, Nat. Mamm. Nepaul. and Tbibet*, p. 4 (1846); *Flower, P.Z.S.* 1900, p. 347; *Bonhote, loc. cit.* p. 876.

Myotis muricola (Hodgson), *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 321.

1 spm. in alc. Bukit Besar, Nawngchik, 2500′. 1st September, 1901.

'This species was not uncommon on Bukit Besar, especially during our second visit in August and September. It appeared in great numbers in the half-hour preceding sunset, flying very much in the manner of the common British serotine. In the jungle it was frequently to be seen up to about 10 a.m., but during the daytime it retired to the young rolled-up leaves of musaceous and zingiberaceous plants, from which the individual recorded above was obtained.'

32. Emballonura peninsularis, Miller

Emballonura peninsularis, *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 328.

4 spms. in alc. Jeram Kawan, South Perak. 15th February, 1902.

As these specimens are practically topotypes[1] of Mr. MILLER's species, I have placed them under that name. According to Mr. MILLER, it is most nearly allied to *E. monticola*, Temm., from Java.

33. Taphozous longimanus, Hardwicke

Taphozous longimanus, *Hardwicke, Trans. Linn. Soc.* XIV, p. 535 (1823); *Flower, P.Z.S.* 1900, p. 349.

a, b. ♂. Biserat, Jalor. 15th July, 1901.

'A cave species.'

Petaurista nitida, Desm.

'We were disappointed at not securing any specimen of flying squirrel, all the species of which are very largely nocturnal in their habits; one of a uniform foxy-red, which may be supposed to belong to this species, was shot at Sungkei, but stuck in the fork of a tree and could not be retrieved.'

34. Ratufa bicolor (Sparrm)

Sciurus bicolor, *Sparrm. Götheb. Vet. Svensk. Handl.* I, p. 70 (1778).

Ratufa bicolor (Sparrm.), *Flower, P.Z.S.* 1900, p. 354; *Bonhote, Ann. Mag. Nat. Hist.* (7) vol. V, 1900, p, 493; *Id. P.Z.S.* 1900, p. 876.

Ratufa melanopepla, *Miller, Proc. Wash. Acad. Sci.* II, p. 71 (1900).

a-c. ♂. Neighbourhood of Biserat, Jalor. July and August, 1901.

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[1] Jeram Kawan is, however, over two hundred miles from Trang, the type locality of the species. *Edd.*

I have very carefully compared these specimens with a series in the Museum from Java and Sumatra, as well as with a paratype of Mr. MILLER's *R. melanopepla*. Mr. MILLER states (*loc. cit.*) that *R. melanopepla* differs from true *R. bicolor* 'in the clear black of the upper parts,' which is by no means a constant feature, and I can match these individuals exactly with Javan specimens. Nevertheless, from what we already know of the variability of members of this group, I should not be surprised that, on comparison with a large series from Java, the Malay form should turn out to be distinct.

'Although only a few specimens were obtained, this giant squirrel, which is known locally as *Grabok*, is fairly common in Jalor, in the neighbourhood of Biserat, where it usually frequents the jungle, keeping to the topmost branches of lofty trees and taking a very heavy charge of shot to bring down. When the fruit is ripe it is often to be found in the orchards surrounding the villages, being like nearly all animals, from the tiger downwards, exceedingly fond of durians. In no instance did we observe any specimen of the fawn-coloured forms on the Eastern side of the Peninsula, although one or two were noticed in the high jungle near Sungkei, South Perak.'

35. Sciurus hippurus, Is. Geoffr.

Sciurus hippurus, *Is. Geoffr. Etudes Zool.* No. 6 pl. 6 (1832) ; *Anders. Zool. Res. Yunnan*, p. 241 (1879) ; *Flower, P.Z.S.* 1900, p. 356.

a. ♀ ad. Sungkei, South Perak. 10th February, 1902.

The occurrence of *S. hippurus* and *S. erythraeus* in the Peninsula proves the former to be a distinct species, and not merely the southern representative of the latter, as has been suggested.

'This was the only specimen seen, and was shot running along a fallen tree in deep jungle.'

36. Sciurus erythraeus, Pall.

Sciurus erythraeus, *Pallas, Glires*, p. 337 (1778) ; *Flower, P.Z.S.* 1900, p. 356 ; *Bonhote, loc. cit.*, p. 877 ; *id. Ann. Mag. Nat. Hist.* (7) III, p. 161 (1901).

a. ♂. Gunung Semangko, borders of Pahang and Selangor, alt. 4000'. 10th May, 1902.

The further occurrence of this species in the Malay Peninsula renders it certain that its range extends considerably further south than was formerly supposed, but possibly it is confined to the hills. In appearance this specimen most nearly approaches *S. erythraeus typicus* from Assam ; the red tail is, however, lacking, being alternately ringed with black and rufous, and the rufous is more strongly developed on the head than elsewhere.

'From the fact that the only two specimens known from the Malay Peninsula have both been procured at altitudes exceeding 4000′, it is, I should say, almost certain that the species in this region is a purely mountain form. Parallel instances occur among the birds, for such species as *Mesia argentauris*, *Siva sordidior*, and *Brbinga remifer*, all forms of an Himalayan facies, are rarely, if ever, seen below an altitude of 3000′.'

Sciurus finlaysoni, Horsf.

'On Bukit Besar Mr. ANNANDALE saw a party of four individuals of a species about the size of *S. concolor*, one of which was pure white, while the others were bright foxy-red. Afterwards, at the base of the hill, we examined two specimens in the possession of the Siamese magistrate of the district. One of these was bright red, but the other was pure white, with the iris pink, and the nails and skin devoid of pigment—in fact, the specimen was undoubtedly an albino.'

As a rule, white specimens of this species are not albinos, having black eyes and very dark nails.

37. Sciurus concolor, Blyth

Sciurus concolor, *Blyth*, *J. A. S. B.* xxiv, p. 274 (1855); *Bonbote*, *Ann. Mag. Nat. Hist.* (7) vii, p. 272 (1901).
Sciurus caniceps, *Gray*, *Flower*, *P.Z.S.* 1900, p. 356; *Bonbote*, *loc. cit.*, p. 877.

a.	♀.	Patani.	16th June, 1901.
b, c.	♂, ♀.	Patani.	16th and 19th June, 1901.
d-h.	♂, ♂.	Biserat, Jalor.	July, 1901.
i-m.	♀, ♀ imm.	Biserat, Jalor.	July, 1901
n.	♀.	Biserat, Jalor.	10th August, 1901.
o-p.	♂ imm.	Biserat, Jalor.	October, 1901.
q.	♂.	Anak Bukit, Nawngchik.	25th April, 1901.
r.	♀.	Bukit Besar, do. 2500′.	2nd September, 1901.
s-v.	♂ imm.	Ban Sai Kau, Nawngchik.	September, 1901.
w.	♀.	Ban Sai Kau, Nawngchik.	19th May, 1901.
x.	♂.	Kuala Lumpur, Selangor.	October, 1900.

This series shows very little variation; most of the specimens are in their dullest pelage, but in a few the brown colour of the back is much more intense, though the annulations on the hairs are always plainly visible. The brightest specimens are all females, which would, therefore, appear to keep in their bright dress later than the males. The young are dull in colour, resembling their parents in their duller pelage.

'This species is emphatically the village squirrel of the Patani States, and it is very exceptionable to find it otherwise than in the immediate proximity of dwellings. It is exceedingly abundant in the cocoanut groves and orchards, and commits great ravages among the fruit, being particularly destructive to the jack fruit or nangka (*Artocarpus integrifolia*). It is commonly seen on the trees in the early morning, up till about 9 a.m., and after about 4 p.m., and in the heat of the day remains hidden in the crowns of the palms, where it also forms nests similar to the *drey* of the British species. In South Perak, if it occurs, it must be very rare, and we never saw a specimen, but in the neighbourhood of Kuala Lumpur it, or a closely allied species, is fairly abundant. An entirely black variety was seen at Biserat on several occasions.'

Mr. ANNANDALE also notes :—'On the upper reaches of the Patani River, the village squirrel was an almost uniformly grey species. A grey species very similar in appearance extended also, as far as I could see, from Lampam, in Patalung, to Trang, though it was absent, or very rare, in the Jarum district and in Upper Perak.'

38. **Sciurus macclellandi leucotis** (Temm.)

Tamias leucotis, *Temminck*, *Zool. sur la côte de Guenée*, p. 252 (1853).
Sciurus macclellandi, (Horsf.) *Flower*, *P.Z.S.* 1900, p. 357.
Sciurus macclellandi leucotis, *Bonhote*, *Ann. Mag. Nat. Hist.* (7) v, p. 53 (1900).

a-c.	2 ♂, ♀.	Telôm, Perak-Pahang boundary, alt. 4000′.	January, 1902.
d, e.	♂, ♀.	Semangko Pass, Selangor, alt. 2700′.	10th May, 1902.

'This beautiful little species was not met with on the Eastern side of the Peninsula. In Perak and Selangor it is certainly a mountain form, and I do not think that it occurs much below 3000′. It was very common at Telôm, and was also very abundant on the mountains round the Semangko Pass. It is very largely an insectivorous species, and seems to keep chiefly to the trunk and main branches of the trees, running along them with its tail pressed close against the bark.'

39. **Sciurus tenuis surdus**, Miller

Sciurus tenuis surdus, *Mill. Proc. Wash. Acad. Sci.* II, p. 80 (1900).
Sciurus tenuis, (Horsf.) *Flower*, *P.Z.S.* 1900, p. 357 ; *Bonhote*, *loc. cit.*, p. 878.

a-d.	♂, 3 ♀.	Bukit Besar, Nawngchik, 2500′.	May, 1901.
e-g.	♂.	Bukit Besar, Nawngchik, 2500′.	26th August and 1st September.
h, i.	♀.	Bukit Besar, Nawngchik, 2500′.	31st August and 1st September.
k, l.	juv.	Bukit Besar, Nawngchik, 2500′.	27th August.
m-q.	4 ♂, ♀.	Telôm, Perak-Pahang boundary, alt. 4000′.	January, 1902.
r.	♂.	Semangko Pass, Selangor, alt. 2700′.	13th May, 1902.

Dimensions of type (measured in the flesh) :—Head and body, 130 mm.; Tail, 95 mm.; Hind foot, 28 mm.; Ear, 12 mm.

Skull. Greatest length, 35 mm.; Basal length, 28 mm.; Length of palate from henselion, 15 mm.; Length of molar series, 5·5 mm.; Zygomatic breadth, 21·5 mm.; Interorbital breadth, 11 mm.; Length of ansals, 10 mm.

Habitat. Bukit Besar, Nawngchik, 2500′.

Type. Adult female, collected on the 30th August, 1901. Original number, 136.

The size of this squirrel suffices to distinguish it at once from *Sc. lowii*, the only species with which it might be confounded. In colour it is rather paler and lacks the warm tinge. One specimen only was obtained, so that it would not appear a very common species, though possibly occasionally confused with *Sc. tenuis*, from which it may be at once distinguished by the colour of the under parts. That another species of Bornean facies should occur on the Peninsula is by no means surprising, and we may soon expect to find most Bornean species with their Malay representatives.

'In the field this species might certainly be readily confounded with *Sc. tenuis*, but I find that this specimen is noted in my journal as possibly distinct.'

44. Funambulus insignis jalorensis subsp. nov.

Funambulus insignis (Cuvier) *Bonhote*, *P.Z.S.* 1900, p. 878.

When working out the 'Skeat' collection I noted that the single specimen sent home differed from those hitherto described, and the advent of two more specimens exactly resembling it leave no doubt of the existence of a distinct race from the Eastern side of the Peninsula.

Differs from *S. insignis* of Sumatra in its much greyer coloration, the only rufous parts being the shoulders and thighs. The dorsal stripes are black and well marked, the centre one reaching as far as the back of the crown of the head. Under parts pure white, except the inside of the thighs, which are yellowish.

Skull. The skull is rather more slender than those from the West Coast of the Peninsula, and may be most easily recognized by the nasals, which are slightly shorter and taper off posteriorly to a much greater extent. The series of skulls is so imperfect that it is not possible to give a fuller description.

Dimensions of type (measured in the flesh) :—Head and body, 183 mm.; Tail, 98 mm.; Hind foot, 38 mm.; Ear, 10 mm.

Habitat. Bukit Besar (Jalor[1]), 2500′.

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[1] Strictly speaking the side of Bukit Besar on which we collected is not in Jalor, but in the neignbouring petty State of Nawngchik. The boundary, however, was said to run along the crest of the hill barely half-a-mile from our encampment. *Edd.*

Type. Adult male, collected on the 9th May, 1901. Original number, 9.

The grey colour forms a very conspicuous difference by which this race may be readily recognized. Specimens from the West Coast do not appear to differ from those found in Sumatra. A second specimen was procured from the same locality in August.

Dimensions of skulls compared with one from the West Coast.

	Greatest length	Palatal length	Length of nasals	Least width of nasals	Zygomatic breadth	Interorbital breadth
Type of *jalorensis*	50 mm.	21 mm.	15 mm.	3 mm.	27·5 mm.	14
Co-type „	49·5 mm.	20 mm.	15 mm.	4 mm.	27·5 mm.	14·5
Spm. from W. Coast	...	21·5 mm.	15·5 mm.	4·5 mm.	29 mm.	16

'Almost purely terrestial in its habits; of the two specimens in the collection, one was shot on the ground and the other caught in a trap baited with melon rind.'

45. **Mus cremoriventer**, Miller

Mus cremoriventer, *Miller*, *Proc. Biol. Soc. Wash.* XIII, p. 144 (1900).

a.	♂ ad.	Bukit Besar, Nawngchik, 2500'.	4th September, 1901.
b.	♂ ad. in alc.	Bukit Besar, Nawngchik, 2500'.	18th May, 1901.

I have compared these specimens with some paratypes kindly lent me by Mr. MILLER, and with which they perfectly agree.

'These two specimens were trapped in the jungle with traps baited with melon rind, whereas *Mus bukit* came into our hut and were caught by the cook in the rice-bags.'

46. **Mus surifer**, Miller

Mus surifer, *Mill. Proc. Biol. Soc. Wash.* XIII, p. 149 (1900).

a-d.	2 ♂, 2 ♀.	Goah Tanah, Bukit Tapang, Biserat, Jalor.	July, 1901.
e.	♀.	Goah Tanah, Bukit Tapang, Biserat, Jalor.	10th July, 1901.
f.	♂.	Bukit Besar, Nawngchik (at foot of hill).	17th September, 1901.
g.	♀.	Jeram Kawan, South Perak	15th February, 1902.
h.	♀ in alc.	Biserat, Jalor.	July, 1901.

This series, which is slightly duller in colour, shows less black on the back than a series of paratypes forwarded to me for comparison by Mr. MILLER. The species seems to be very largely an inhabitant of caves. The specimen brought home by the 'Skeat' expedition, and referred by me to *Mus cremoriventer*, belongs to the present species. Apart from other differences, *Mus cremoriventer* is much smaller and has a uniformly brown tail.

As pointed out by Mr. Miller, the species bears a very close resemblance to *Mus rajah*, Thos., from which it only differs in external appearance by its smaller size. The skull, however, apart from its size, has a much more slender rostrum.

47. **Mus bukit**, Bonhote.

(Plate IV, fig 2).

Mus bukit, *Bonbote*, *Ann. Mag. Nat. Hist.* (7) xi, p. 125 (1903).

Similar in appearance to *Mus cremoriventer*, Miller, and *Mus kina*, Bonh., but larger than either.

General colour of a uniform pale ochreous, intermixed with short black hairs, which are nowhere so prominent as to unduly predominate. Sides paler and greyer, caused by an absence of black hairs and general shortness of fur, which enables the light-coloured spines to show through. Under parts yellowish-white, sharply defined from the colour of the upper parts. Feet with dark-brown centres and light toes and margins. Tail rather longer than the head and body, markedly bicolor and scantily clad with hairs.

Skull. Intermediate between those of *M. rapit* and *M. kina*. In size it approaches most nearly to that of *M. rapit*, but the muzzle is considerably shorter and broader in proportion, and the auditory bullae are larger. The anterior zygoma root is very large and solid, greatly exceeding in size that of *M. rapit*. The nostrils are long and taper greatly towards their posterior end. The supraorbital ridges are well marked, and extend right backwards to the posterior margin of the parietals. The bullae are large and well developed, but lie rather flatter than in *M. kina*.

Dimensions of the type (measured in the flesh):—Head and body, 121 mm.; Tail, 148 mm.; Hind foot, 24·5 mm.; Ear, 17 mm.

Skull. Greatest length, 37 mm.; Basal length, 28 mm.; Palatal length, 16 mm.; Diastema, 9·5 mm.; Length of incisive foramina, 6 mm.; Length of nasals, 15 mm.; Zygomatic breadth, 18 mm.; Interorbital breadth, 6 mm.; Greatest breadth of brain case, 15 mm.; Length of molar series, 6·5 mm.

Habitat. Bukit Besar, Nawngchik, 2500′.

Type. Adult male, collected 10th May, 1901. Original number, 11.

The series brought home by Messrs. Robinson and Annandale, consisting of two males and three females, is very uniform, and presents no individual variation, whilst, at the same time, they exactly agree with several specimens sent home from Siam by Mr. Lyle, and recorded by me as *Mus jerdoni*[1]. I have thought it well to name this species, though subsequent investigations may prove it to be a synonym of *M. jerdoni*.

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[1] *P.Z.S.*, 1902, p. 39.

The specimen of *Mus pellax* in the British Museum is practically a topotype of *M. jerdoni*, but, as I have stated elsewhere, until the skin and skull of Blyth's *M. jerdoni* can be closely compared with specimens of *M. pellax* and *M. bukit*, the matter cannot be definitely settled. The skulls, however, of these last two species being so distinct there should be no difficulty in deciding the question, even though the type is young.

48. **Mus rufescens**, Gray.

(Plate IV, fig. 3).

Mus rufescens, Gray, *Charlesw. Mag. Nat. Hist.* 1, p. 585 (1837); *Bonhote*, *P.Z.S.* 1900, p. 878.
Mus rattus, (Linn.), *Flower*, *P.Z.S.* 1900, p. 361.

a, b. ♂, ♀ ad. Biserat, Jalor. 4th July, 1901.

In external appearance these specimens agree well with the most common form of the rattus group found in the Peninsula; the skull, however, is distinguished by having very small teeth. As, however, I find a certain amount of variability in the size of the teeth in a series from Siam and the Peninsula, I presume it is merely a question of individual variation.

49. **Mus jalorensis**, sp. nov.

(Plate II, figs. 1 and 2, and Plate IV, fig. 4).

A medium sized short tailed rat of the *Mus rattus* group.

Fur moderately long and soft, thickly interspersed with very slender spines. General colour warm grizzled brown, becoming greyer on the flanks. Each hair is ashy-grey at the base with a broad brownish tip, the spines are whitish with a black tip, and there are also some long black hairs. Under parts pure white, sometimes with a slightly yellowish tinge, the line of demarcation between the upper and under parts being well marked. Feet, dark brown. The tail hardly exceeds the head and body in length, and is uniformly dark throughout, and scantily clothed with very short stiff hairs.

Skull. Similar to that of *Mus rufescens* from the Malay Peninsula, but smaller and narrower. The nasals taper greatly towards their posterior end. The supraorbital ridges end altogether or become inconspicuous about the middle of the parietals. Viewed from below, except for being narrower and more slender, the skull does not offer any very striking points of difference. The bullae are rather more rounded and do not appear to stand out quite so much from the base of the skull.

Dimensions of type (measured in the flesh :—Head and body, 144 mm.; Tail, 177 mm.; Hind foot, 31·5 mm.; Ear, 19 mm.

Skull. Greatest length, 40 mm.; Basal length, 32 mm.; Palatal length, 19 mm.; Diastema, 11 mm.; Length of incisive foramina, 7 mm.; Length of nasals, 14 mm.; Combined breadth of nasals: Anteriorly, 4 mm.; Posteriorly, 1·5 mm.; Zygomatic breadth, 19 mm.; Interorbital breadth, 6 mm.; Breadth of brain case at roots of zygomata, 14 mm.; Length of molar series, 7 mm.

Habitat. Ban Sai Kau, Nawngchik, and in the neighbouring State of Jalor. Also found in Perak and Siam.

Type. Adult female, Ban Sai Kau, Nawngchik, collected on the 11th September, 1901. Original number, 148.

This rat may be easily recognized by its dark and uniform upper surface, short tail, black feet, and white under parts. In *Mus rufescens* the back is much lighter and not so uniform in colour, tail rather longer, and feet white. *Mus rufescens* has also a considerable longer ear.

The series of eight individuals in the present collection is very uniform, and the Museum also contains specimens from Siam, so that it would appear to range from Burmah eastwards.

Series received in present collection.

a, b.	2 ♀ ad.	Ban Sai Kau, Nawngchik. (one of these is the type).	11th September, 1901.
c.	♀.	Biserat, Jalor.	17th July, 1901.
d-h.	2 ♂, 3 ♀.	Telôm, Perak-Pahang boundary, alt. 4000′.	January, 1902.

Average measurements compared with *M. rufescens*:—

Mus jalorensis. Head and body, 145 (137-152) mm.; Tail, 165 (151-177) mm.; Hind foot, 30 (29·5-31·5) mm.; Ear, 17·5 (19-17) mm.

Mus rufescens (Siam). Head and body, 170 mm.; Tail, 184 mm.; Hind foot, 32 mm.; Ear, 24 mm.

SKULL	Greatest length	Basal length	Palatal length	Diastema	Length of nasals	Breadth of nasals		Zygomatic breadth	Interorbital breadth	Breadth of brain case	Molar series
						Anterior	Posterior				
	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.
M. jalorensis ... ... (Av. of 7 spms.)	38·5	31·7	18	10·2	13	4	2	18·5	6	14	7
M. rufescens	43	34	20	12	16	5	3	20	6·5	15	8

'*Not* a house rat; the Telôm specimens came from deep jungle; and the others were trapped in the rice-fields.'

50. **Mus griseiventer**, sp. nov.

(Plate II, fig. 3, and Plate IV, fig. 5).

A species of the *Mus rattus* group. Fur soft, short, and close, containing a few slender and scattered spines.

General colour of upper parts very much as in the last species, but rather paler and more uniform in coloration throughout, being hardly, if at all, darker along the centre of the back. Under parts uniform dull grey, with a yellowish tinge caused by fulvous tips to some of the hairs. Feet, dark brown; ears short, naked, and rounded. Tail rather longer than the head and body, of a uniform black throughout, covered with numerous short stiff black hairs.

Skull. Similar to that of *Mus jalorensis*, but longer and narrower. The nasals do not appear to taper quite as much, and the supraorbital ridges are more strongly marked and inclined outwards. The bullae are slightly larger, not converging anteriorly quite as much, and the incisive foramina are also rather narrower.

Dimensions of type (measured in the flesh):—Head and body, 161 mm.; Tail, 212 mm.; Hind foot, 35 mm.; Ear, 19 mm.

Skull. Greatest length, 42 mm.; Basal length, 35 mm.; Palatal length, 20 mm.; Diastema, 12 mm.; Length of incisive foramina, 7 mm.; Length of nasals, 15 mm.; Combined breadth of nasals: Anteriorly, 4 mm.; Posteriorly, 2 mm.; Zygomatic breadth, 19 mm.; Interorbital breadth, 6 mm.; Breadth of brain case at roots of zygomata, 15 mm.; Length of molar series, 7 mm.

Habitat. Bidor, South Perak.

Type. Adult female, collected on the 3rd February, 1902. Original number, 215.

The size of the hind foot and comparative shortness of the ear form two features by which this species may be easily recognized. The uniform dull coloration and grey under parts enable it to be distinguished at a glance from *Mus jalorensis*. The tail in the type appears somewhat longer than that in the remainder of the series.

Four specimens, 2 ♂ and 2 ♀, were brought back, all from the same locality. The average measurements of the four are:—Head and body, 155 mm.; Tail, 177 mm.; Hind foot, 34 mm.

'A house rat; very abundant in the Bidor rest-house.'

51. **Mus annandalei**, sp. nov.

(Plate IV, fig. 1).

A medium-sized rat, allied to *Mus neglectus*, JENT. Fur soft and moderately long; entirely destitute of spines.

General colour grizzled fulvous, having a slightly darker area from the nose and down the middle of the back. Under parts pure white, somewhat tinged with ochraceous, the line of demarcation not being very distinct. Outer sides of all four limbs greyish-brown, inner sides of fore limbs white, of hind limbs dark brown. Feet dark brown. Tail slightly longer than the head and body, uniform black in colour, and covered with short stiff hairs. Ears somewhat elongated and naked.

Skull. The skull, which is elongated, is chiefly noticeable for the large bullae. The nasals, which are of a fairly level breadth throughout their length, end in a line with the posterior margin of the praemaxillae. The supraorbital ridges, which are not well marked, end about half-way across the parietal. The anterior root of the zygoma bends abruptly outwards about its centre. Viewed from below the most conspicuous features are the audital bullae, which are very large and rounded, compressing the basioccipital and making it narrow.

Dimensions of type (measured in the flesh) :—Head and body, 151 mm. ; Tail, 196 mm. ; Hind foot, 35 mm. ; Ear, 17 mm.

Skull. Greatest length, 44 mm. ; Basal length, 33 mm. ; Palatal length, 19 mm. ; Diastema, 11 mm. ; Length of incisive foramina, 7·5 mm. ; Length of nasals, 16 mm. ; Zygomatic breadth, 19·5 mm. ; Breadth of brain case at posterior roots of zygomata, 15 mm. ; Length of molar series, 7·5 mm. ; Length of bullae, 8 mm. ; Length between external and internal auditory meatus, 7 mm. ; Breadth of basioccipital anteriorly, 8 mm.

Habitat. Sungkei, South Perak.

Type. Adult female, collected on the 8th February, 1902. Original number, 223.

This species must be considered as allied to the *Mus rattus* group, although the large size of the bullae give the skull a very distinct and easily recognizable appearance. Superficially it is somewhat like *Mus validus*, Mill., only considerably smaller ; whilst its nearest ally would appear to be *Mus neglectus*, from Borneo.

'Trapped among old tree stumps near a patch of recently cleared jungle.'

I append a list of names with references to original descriptions and type localities, showing the main groups into which some of these Oriental rats may be classed. The list has no pretence at being complete or exhaustive, but it may, perhaps, by rough subdivision, enable more competent workers to attack and put in order the unwieldly genus *Mus*.

It has been found impossible to divide these species into groups of equal value. In the case of the *Jerdoni*, *Whiteheadi*, *Xanthurus*, and *Rattus* sections, these groups are so subdivided as to have become, for practical purposes, of almost generic value, although showing no characters of sufficient importance to enable them to be generically separated. The remainder are groups of slightly superspecific value, and equal to the subgroups of the more variable forms.

JERDONI GROUP

Moderate sized to large rats; fur as a rule thickly beset with spines. Colour above, brown or ochraceous, sharply marked off from pure white under parts. Tail long and generally bicolor.

WHITEHEADI GROUP

Similar to above but tail short, and the species all of moderate size. Colour of upper parts not sharply divided from that of lower parts, which are generally of a buffy white.

XANTHURUS GROUP

Large, soft-furred rats of brownish colour above, not sharply divided from that of the under parts, which are lighter in colour, sometimes white. The tail is of moderate length, naked, and *its terminal portion white.*

MUELLERI GROUP

Large grizzled rats with long *black* tail. Under parts white.

BOWERSI GROUP

Large rats of a silvery or brownish-grey colour minutely flecked with white. Tail long, unicolor.

RATTUS GROUP

The large and difficult group of *Mus rattus*, I propose, dealing only with Oriental specimens, to divide into three subgroups, viz.:—*Rufescens*, *Pyctoris*, and *Griseiventer*.

(*a*) Subgroup Rufescens

Hairs long, light coloured and yellowish, especially along the flanks, interspersed with longer black ones down the centre of the back. Ears large. Under parts white or yellowish-white. Tail slightly longer than head and body. Average measurements:—Head and body, 170 mm.; Tail, 184 mm.; Hind feet, 32 mm.; Ear, 24 mm. A tree rat.

(*b*) Subgroup Pyctoris[1]

Hair moderately long and soft; much darker and more uniform above than *rufescens*. Under parts white. Tail bearing about the same proportion to the head and body as in the former subgroup, possibly rather shorter. Whole animal smaller, especially the ear. Average measurements:—Head and body, 145 mm.; Tail, 165 mm.; Hind feet, 30 mm.; Ear, 21 mm. A hill rat.

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[1] This is the *nitidus* group of Thomas and various authors; *Mus nitidus* belongs to my third subgroup, which I have called *griseiventer* to save confusion. The types of both *pyctoris* and *nitidus* are in the British Museum.

(*c*) **Subgroup Griseiventer**

Larger. Hairs short and close. General colour much more uniform. Under parts grey or yellowish-grey. Tail longer than head and body. Hind foot very large; ear small. Average measurements :—Head and body, 155 mm.; Tail, 177 mm.; Hind feet, 35 mm.; Ear, 19 mm. A house rat.

CHRYSOCOMUS GROUP

Small rats, of a dull uniform colour; tail short, not exceeding the head and body in length. They may most easily be recognized by their very soft, sooty fur.

I have endeavoured, as far as possible, in the following lists, to assign each name to a group, but, in some instances, this has been found impossible, and in others there has been only a very scanty description to go upon. A group has not always been called after the name of the oldest species it contains, but rather after a species which is fully described and can be easily identified.

JERDONI GROUP

Subgroup Edwardsi

Mus edwardsi, *Thos. P.Z.S.* 1882, p. 587.	W. Fokien, China.
Mus siporanus, *Thos. Ann. Mus. Civ. Genoa*, xxxiv, p. 11 (1895).	Isle of Sipora, Sumatra.
Mus ciliatus, *Bonhote*, *P.Z.S.* 1900, p. 879.	Gunung Inas, Perak.

Subgroup Sabanus

Mus sabanus, *Thos. Ann. Mag. Nat. Hist.* (5) xx, p. 270 (1887).	Kina Balu, Borneo.
Mus vociferans, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 138 (1900).	Trang, Lower Siam.
Mus lancavensis, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 188 (1900).	Pulau Lankawi, S. China Sea.
Mus strepitans, *Mill. Proc. Wash. Acad. Sci.* ii, p. 207 (1900).	Anambas Island.
Mus fremens, *Mill. Proc. Acad. Nat. Sci. Philad.* 1902, p. 154.	Sinkep Island.

Subgroup Jerdoni

Mus pellax, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 147 (1900).	Trang, Lower Siam.
Mus fulvescens, *Gray*, *Cat. Hodgs. Coll.*, p. 18 (1846).	Nepal.
Mus caudatior, *Hodgs. Ann. Mag. Nat. Hist.* (2) iii, p. 203 (1849).	Nepal.
Mus jerdoni, *Blyth*, *J.A.S.B.* xxxii, p. 350 (1863).	Sikkim.
Mus coxingi, *Swinhoe*, *P.Z.S.* 1864, p. 185.	Formosa.
Mus rapit, *Bonhote*, *Ann. Mag. Nat. Hist.* (7) xi, p. 123 (1903).	Kina Balu, Borneo.

Subgroup Niveiventer

Mus bukit, *Bonhote*, *Ann. Mag. Nat. Hist.* (7) xi, p. 125 (1903).	Jalor, Malay Peninsula.
Mus niveiventer, *Hodgs. J.A.S.B.*V. p. 234 (1836).	Nepal.
Mus confucianus, *M. Edw. Nouv. Arch. Mus.* vii, p. 93 (1871).	Moupin, China.

Subgroup Rajah

Mus rajah, *Thos. Ann. Mag. Nat. Hist.* (6) xiv, p. 451 (1894).	Borneo.
Mus hellwaldi, *Jentink*, *Notes Leyden Mus.* p. 11 (1878).	Celebes.
Mus anambae, *Mill. Proc. Wash. Acad. Sci.* ii, p. 205 (1900).	Anambas Island.
Mus lingensis, *Mill.* „ „ „ p. 206 (1900).	Linga Island.

Subgroup Rajah—*continued*

Mus surifer, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 148 (1900).	Trang, Lower Siam.
Mus flavidulus, *Mill.* „ „ „ p. 189 (1900).	Pulau Lankawi.
Mus butangensis, *Mill.* „ „ „ p. 190 (1900).	Butang.

Subgroup Cremoriventer

Mus cremoriventer, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 144 (1900).	Trang, Lower Siam.
Mus flaviventer, *Mill. Proc. Wash. Acad. Sci.* ii, p. 204 (1900).	Anambas Island.
Mus kina, *Bonhote, Ann. Mag. Nat. Hist.* (7) xi, p. 124 (1903).	Kina Balu, Borneo.

WHITEHEADI GROUP

Mus whiteheadi, *Thos. Ann. Mag. Nat. Hist.* (6) xiv, p. 452 (1894).	Kina Balu, Borneo.
Mus ochraceiventer, *Thos.*, „ „ „ p. 451 (1894).	Kina Balu, Borneo.
Mus musschenbroeki, *Jentink, Notes Leyden Mus.* p. 19 (1878).	Celebes.
Mus alticola, *Thos. Ann. Mag. Nat. Hist.* (6) ii, p. 408 (1888).	Kina Balu, Borneo.
Mus baeodon, *Thos.* „ „ (6) xiv, p. 452 (1894).	Kina Balu, Borneo.
Mus asper, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 145 (1900).	Trang, Lower Siam.

BOWERSI GROUP

Mus bowersi, *Anders. Zool. Res. Yunnan*, p. 304 (1879).	Yunnan.
Mus latouchei, *Thos. Ann. Mag. Nat. Hist.* (6) xx, p. 113 (1897).	Kuatun, China.
Mus ferrocanus, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 140 (1900).	Trang, Lower Siam.
Mus berdmorei, *Blyth, J.A.S.B.* xx, p. 173 (1851).	Mergui.

XANTHURUS GROUP

Mus xanthurus, *Gray, P.Z.S.* 1867, p. 598.	Celebes.
Mus celebensis, *Gray, P.Z.S.* 1867, p. 598.	Celebes.
Mus meyeri, *Jentink, Notes Leyden Mus.* i, p. 12 (1878).	Celebes.
Mus everetti, *Gunth, P.Z.S.* 1879, p. 75.	Luzon, Philippines.
Mus macleari, *Thos. P.Z.S.* 1887, p. 573.	Xmas Island.
Mus luzonicus, *Thos. Ann. Mag. Nat. Hist.* (6) xvi, p. 163 (1895).	Luzon, Philippines.

MUELLERI GROUP

Mus muelleri, *Jentink, Notes Leyden Mus.*, p. 16 (1879).	Sumatra.
Mus palmarum, *Zelebor, Reise der Öst Fregat. Novara, Zool.* i, p. 26 (1869).	Nicobars.
Mus validus, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 141 (1900).	Trang, Lower Siam.
Mus integer, *Mill. Proc. Wash. Acad. Sci.* iii, p. 111 (1901).	Sirhassen Island.
Mus firmus, *Mill. Proc. Acad. Nat. Sci. Philad.* 1902, p. 155.	Linga Island.
Mus stoicus, *Mill. Proc. U.S. Nat. Mus.* xxiv, p. 759 (1902).	Henry Laurence Island, Andamans.
Mus taciturnus, *Mill. Proc. U.S. Nat. Mus.* xxiv, p. 762 (1902).	S. Andaman Island.

INFRALUTEUS GROUP

Mus infraluteus, *Thos. Ann. Mag. Nat. Hist.* (6) ii, p. 409 (1888).	Kina Balu, Borneo.

RATTUS GROUP

Subgroup Rufescens

Mus rufescens, *Gray, Charlesw. Mag. Nat. Hist.* i, p. 585 (1837).	India.
Mus flavescens, *Elliot, Madr. Journ.* x, p. 214 (1839).	Madras.
Mus brunneusculus, *Hodg. Ann. Mag. Nat. Hist.* xv, p. 267 (1845).	Nepal.
Mus tetragonurus, *Kelaart, Prodromus* (1850).	Ceylon.
Mus nemoralis, *Blyth, J.A.S.B.* xx, p. 168 (1851).	Ceylon.
Mus robustulus, *Blyth, J.A.S.B.* xxviii, p. 294 (1859).	Tenasserim.
Mus andamanensis, *Blyth, J.A.S.B.* xxix, p. 103 (1860).	Andamans.
Mus flavipectus, *M. Edw. Nouv. Arch. Mus.* vii, p. 93 (1871).	Moupin, China.
Mus sladeni, *Anders. Zool. Res. Yunnan*, p. 305 (1879).	Yunnan.
Mus yunnanensis, *Anders. Res. Yunnan*, p. 306 (1879).	Yunnan.
Mus vicerex, *Bonhote, Ann. Mag. Nat. Hist.* (7) xi, p. 473 (1903).	Simla.

Subgroup Pyctoris

(the nitidus group of Thomas, Sclater, and other authors.)

Mus pyctoris, *Hodgs. Ann. Mag. Nat. Hist.* xv, p. 267 (1845).	Nepal.
Mus aquicaudalis, *Hodgs. Ann. Mag. Nat. Hist.* (2) iii, p. 203 (1849).	Nepal.
Mus rubricosa, *Anders. Zool. Res. Yunnan*, p. 306 (1879).	Yunnan.
Mus neglectus, *Jentink, Notes Leyden Mus.* 1879, p. 14.	Borneo.
Mus tiomanicus, *Mill. Proc. Wash. Acad. Sci.* iii, p. 209 (1900).	Tioman Island.
Mus jalorensis, *Bonhote, antea*, p. 29.	Jalor.

Subgroup Griseiventer

Mus indicus, *Desm. (nec Bechst.) Mamm.* ii, p. 299 (1822).	Pondicherry.
Mus asiaticus, *Gray, Ann. Mag. Nat. Hist.* i, p. 585 (1837).	India.
Mus rattoides, *Hodgs. Ann. Mag. Nat. Hist.* xv, p. 267 (1845).	Nepal.
Mus nitidus, *Hodgs. Ann. Mag. Nat. Hist.* xv, p. 267 (1845).	Nepal.
Mus kandianus, *Kelaart, Prodromus* (1850).	Ceylon.
Mus germaini, *M. Edw. Rech. Mamm.*, p. 289 (1874).	Pulau Condor.
Mus pannosus, *Mill. Proc. Biol. Soc. Wash.* xiii, p. 190 (1900).	Butang.
Mus tambelanicus, *Mill. Proc. Wash. Acad. Sci.* ii, p. 212 (1900).	Big Tambelan Island.
Mus siantanicus, *Mill. Proc. Wash. Acad. Sci.* ii, p. 210 (1900).	Pulau Siantan.
Mus atratus, *Mill. Proc. U.S. Nat. Mus.* xxiv, p. 767 (1902)	Barren Island, Andamans.
Mus flebilis, *Mill. Proc. U.S. Nat. Mus.* xxiv, p. 762 (1902).	Henry Laurence Island, Andamans.
Mus pulliventer, *Mill. Proc. U.S. Nat. Mus.* xxiv, p. 765 (1902).	Great Nicobar Island.
Mus griseiventer, *Bonhote, antea, p.* 30.	Perak.

I have been unable to refer the following to either of the three subgroups.

Mus decumanoides, *Hodgs. J.A.S.B.* x, p. 915 (1841).
Mus ceylonus, *Kelaart Prodromus*, (1850).
Mus infralineatus, Elliot; *Blyth, J.A.S.B.* xxxii, p. 348 (1863).

CHRYSOCOMUS GROUP

Mus chrysocomus, *Hoffmn. Abh. Mus. Dresd.* iii, p. 20 (1887).	Celebes.
Mus ruber, *Jentink, Notes Leyden Mus.* ii, p. 18 (1879).	New Guinea.
Mus baluensis, *Thos. Ann. Mag. Nat. Hist.* (6) xiv, p. 454 (1894).	Kina Balu, Borneo.
Mus fratrorum, *Thos. Ann. Mag. Nat. Hist.* (6) xviii, p. 246 (1896).	Rurukan, Celebes.
Mus datae, *Meyer, Abh. Mus. Dresd.* vii, p. 25 (1899).	Phillipines.

The following six species are very distinct from all those that have gone before as well as from each other. They are merely noted here to show that they have been taken into consideration when making out the above list.

Mus mettada, *Gray, Charlsw. Mag. Nat. Hist.* i, p. 586 (1837).	Madras.
Mus gleadowi, *Murray, P.Z.S.* 1885, p. 805, pl. li.	W. India.
Mus blanfordi, *Thos. Ann. Mag. Nat. Hist.* (5) vii, p. 24 (1881).	S. India.
Mus humei, *Thos. P.Z.S.* 1886, p. 63, pl. v.	Manipur.
Mus annandalei, *Bonhote, antea*, p. 30.	S. Perak.
Mus coelestis, *Thos. Ann. Mag. Nat. Hist.* (6) xviii, p. 248 (1896).	S. Celebes.

I append a few notes to shew the distinguishing characters of some of the species and subgroups.

The **Edwardsi** group are large rats of a dark colour, their fur intermixed with spines of medium stiffness. In *M. edwardsi* and *M. siporanus* the tail is bicolor and has the terminal third white. In *M. ciliatus* it is uniformly dark. In the original description of *M. siporanus* Mr. Thomas was inclined to consider it as allied to *M. macleari*; a comparison of the skulls, however, clearly shews it to belong to the *Jerdoni* group. I have pointed this out to Mr. Thomas, who concurs in the view here expressed.

Sabanus group. *M. sabanus* is slightly smaller than the rats in the above group, and lighter in colour, especially about the shoulders. The tail is very long, bicolor, and with the tip white.

Jerdoni group. Smaller and much brighter in colour than individuals of the former groups. The fur in this group is much longer and softer than in all the others, being especially so in *M. fulvescens* and *M. caudatior*, which are synonyms. In *M. coxingi*, however, although the fur is very long it is very thickly interspersed with stiff spines. Tail moderately long and bicolor.

The **Niveiventer** group closely resembles the last, but the fur is shorter and very spiny, especially in the case of *M. niveiventer*, where it is of a dull greyish brown on the back. They are all slightly smaller than the *Jerdoni* group, and the tail is shorter in proportion and bicolor.

The **Rajah** group contains rats slightly paler in colour than those of the *Jerdoni* group. They are intermediate in size, between the *Jerdoni* and *Sabanus* groups, and the fur is thickly beset with spines. Tail only slightly longer than the head and body, bicolor, and white for about an inch at the tip.

The **Cremoriventer** group is composed of smaller rats than the previous ones. Fur light yellow, thickly interspersed with spines. Tail of moderate length, unicolor.

Whiteheadi group. *M. whiteheadi* and *M. asper* are very closely allied. *M. ochraceiventer* is larger, has deep ochraceous under parts, and is much darker above. *Mus alticola* is dark brown above, showing no trace of the fulvous tint; the under parts are dull white.

M. baeodon is considerably smaller than *M. whiteheadi*, and has whitish under parts; it also differs in its cranial characters. With the exception of *M. musschenbroeki*, they are all spiny.

Bowersi group. The two specimens from the Hume Collection referred by Mr. Thomas (*P.Z.S.* 1886, p. 62), to *Mus berdmorei*, Blyth, resemble *Mus bowersi* so closely, except in size, that I have no hesitation in placing them in the same group. The hind feet of *M. berdmorei* measures 35 mm., and that of *M. bowersi* 52 mm.

Xanthurus group. The differences between the various species have been tabulated by Mr. Thomas (*P.Z.S.* 1887, p. 573), who also, in his description of *M. luzonicus*, clearly distinguishes it from *M. everetti*.

Muelleri group. This group are large dark coloured rats, with long uniformly black tails. They are all grizzled to a greater or less extent with fulvous; the under parts are, in the case of *M. validus*, of a greyish-white, but in *M. muelleri* itself, yellowish-white.

Mus infraluteus is a fine and distinct species, but allied to the above group in size and cranial characters. It is of a uniform very dark brown above, some of the hairs having light, glistening tips. Under parts with dark grey under fur, and long, light, glistening stiff hairs, of a spiny character.

The divisions into which I have divided the rats of the **Mus rattus** group are, to a large extent, correlated with the habits and situations in which they are found. Those of the *Rufescens* subgroup are tree rats, although in many places they may also be found in houses, and at considerable elevations as well.

The *Pyctoris* subgroup contains hill rats which are not found in low lying land, and *Mus griseiventer* represents the true house rat, its chief characters being the large feet, correlated with short ears. The great difficulty to be contended with in this group is the fact of their travelling about on ships, with the result that many varieties and forms occur which cannot be definitely assigned to any of the subgroups, and this has caused a great number of these varieties to be described. One finds, however, as in the case of most small mammals, that in localities away from the direct influence of imported specimens, individuals from any one district are remarkably constant in their characters. In working out this group, reference should be made to the following sources :—

Oldfield Thomas. *P.Z.S.* 1881, p. 521, etc.
W. L. Sclater. *P.Z.S.* 1890, p. 523.
Cat. Mamm. Ind. Mus., p. 62 (1891).

I have not gone into the Chinese forms of this group with the exception of *M. flavipectus*, which belongs to the *Rufescens* subgroup, differing therefrom only in having the under parts suffused with buffish.

M. vicerex, which I have recently described, is a very well-marked form of *M. rufescens*; its main point of distinction lies in its bicolor tail, which is also well-clothed with moderately long hair. In colour it is a pale-grey form of *M. rufescens*, the long black hairs having a greenish gloss, which, although present in *Rufescens*, is not nearly so conspicuous a feature.

Most of the specimens labelled *M. nitidus* in the Museum belong in reality to *M. pyctoris*, Hodgs., which is chiefly to be distinguished by its darker and warmer tints and its longer fur.

I have placed *M. neglectus* in the *Pyctoris* subgroup, as the most typical specimens certainly agree with the main features of that group. The series in the Museum, however, shews a wide range of variation, which, owing to lack of sufficient data, I have not been able to satisfactorily work out. Some specimens closely approach *M. flavipectus*, which undoubtedly belongs to the *Rufescens* subgroup, while others with their large feet and short ears approximate to the *Griseiventer* subgroup, and it is probable that all three subgroups are represented in Borneo.

Mus nitidus, Hodgs., which has been confounded with *Mus pyctoris*, is a large rat of the *Mus griseiventer* subgroup, resembling this last in the large feet and the comparatively small ears. On the back the type resembles *M. griseiventer*, except in being rather paler; the under parts being of a dirty yellowish-grey. Other specimens, however, from the same locality, are very much brighter on the back.

Mus germaini from Cochin, China, is another species of the *Griseiventer* subgroup, and except in its more fulvous colour is not unlike *M. nitidus;* the under parts, however, are yellowish white instead of yellowish grey, and the hind feet are also whitish.

I have not had time or material to go carefully into the *Chrysocomus* group, but have placed them together, as they may all be easily recognized by their extremely soft, woolly fur, entirely destitute of spines. The skulls of *M. fratrorum* and *M. datae* may be recognized by the long snout, flattened bullae, and large teeth. The skull of *M. baluensis* resembles more closely that of *M. neglectus*, but is somewhat intermediate, having the snout more attenuated and the bullae flatter than in the last named.

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52. Mus concolor, Blyth.

Mus concolor, *Blyth*, *J.A.S.B.* xxviii, p. 295 (1859); *Flower*, *P.Z.S.* 1900, p. 361; *Bonhote*, *op. cit.*, p. 879.

a.	♀	Bukit Besar, Jalor.	10th May, 1901.
b-e.	3 ♂, 1 ♀	Biserat, Jalor.	3rd July, 1901.
f-i.	3 ♂, 1 ♀	Tojan, Nawngchik.	29th Nov., 1901.
k-m.	3 spms. in alc.	Biserat, Jalor.	July, 1901.

'The common house mouse of the Patani States.'

53. Mus, sp.

a. ♀ ad. Jeram Kawan, South Perak, 13th February, 1902.

This mouse is apparently closely allied, if not identical, with *Mus concolor*, but is slightly larger, and owing to the size of the skull I do not feel justified in assigning it to that species.

54. Rhizomys sumatrensis (Raffles)

Mus sumatrensis, *Raffles*, *Trans. Linn. Soc.* xiii, p. 258 (1822).

Rhizomys erythrogenys, *Anders. Zool. Res. Yunnan*, p. 324 (1879).

Rhizomys sumatrensis (Raffles), *Flower*, *P.Z.S.* 1900, p. 363; *Bonbote*, *loc. cit.*, p. 881.

a, b.	♀.	Kampong Jalor, Jalor.	4th November, 1901.
c.	♀.	Gedong, Batang Padang, South Perak.	12th January, 1902.

One of the Jalor specimens, while apparently fairly adult, is considerably smaller and darker than the other two. At first sight, small dark coloured examples of this species resemble *R. pruinosus*, but they may always be distinguished by the red on the face and the longer tail.

They are possibly referable to *R. erythrogenys*, ANDERS., which, on the material at my disposal, I can only consider as a colour phase of the true *R. sumatrensis*, depending on the individual rather than the locality whence it comes.

'We never met with the bamboo rat ourselves, all our specimens having been brought in by natives. With the larger of the Jalor specimens were four young ones, almost exactly resembling their parent in coloration.'

55. **Hystrix grotei** (Gray)

(Plate III)

Acanthochoerus grotei, *Gray*, *P.Z.S.* 1866, p. 310 ; *Sclater*, *loc. cit.*, p. 417.

Hystrix longicauda (Marsden), *Sclater*, *P.Z.S.* 1871, p. 234 ; *Flower*, *P.Z.S.* 1900, p. 364.

Hystrix yunnanensis (Anders.), *Bonhote*, *P.Z.S.* 1900, p. 881.

a–c.	♂, ♀ ♀ ad.	Mabek, Jalor.	27th July, 1900.
d.	♂ imm. (skull only).		27th July, 1900.

The type of *H. grotei*, which is unfortunately a young specimen, and with which I have compared the above, leaves no doubt that these can be referred to that species. The only question about which doubt can exist is as to the advisability of using GRAY's name instead of the *H. longicauda* from Sumatra of MARSDEN[1] ; MARSDEN gives a plate but no description, and without specimens from Sumatra it is impossible to say whether the Sumatran animal is identical with that of the mainland or not.

GRAY's description of his type agrees well with the adult specimens, but in the skin the nuchal crest is not visible, as the spines forming it are hardly, if at all, longer than those on the surrounding parts, but a few of them have a conspicuous white tip. The narrow lunate half collar under the throat is also well marked in all the specimens.

The skull, which is large, approaches most nearly to that of *H. muelleri*, JENT, from Borneo, but is larger and has a much stouter muzzle. The nasals are long and of fairly uniform width throughout their length, their posterior margin being about level with the hinder edge of the first molar, and being longer than the greatest length of the frontals by about half-an-inch. The praemaxilla is of moderate breadth at its posterior end, which lies about level with the anterior margin of the premolar.

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[1] Marsden, *Nat. Hist., Sumatra* (3rd ed.), p. 118, pl. xiii (1818)

The measurements are as follows:—Greatest length, 140 mm.; Henselion to edge of occipital foramen, 113 mm.; Zygomatic breadth, 72 mm.; Length of nasals, 61 mm.; Greatest length of frontals, 51 mm.; Breadth of nasals at posterior edge of praemaxilla, 30·5 mm.; Ditto at tip, 23 mm.

It will be noticed that in these specimens the nasals are about 10 mm. longer than the greatest length of the frontals, whereas in *H. yunnanensis*, which was brought back by the 'Skeat' Expedition two years ago, the nasals are 4 mm. shorter than the frontals. I have, however, compared these skulls with that previously identified as *H. yunnanensis*, and consider that they all belong to the same species.

'Porcupines, presumably of this species, must have been exceedingly abundant round Biserat, especially in the caves, the floors of which were covered with innumerable tracks, but no trap that we could obtain proved effectual. The series in the collection were obtained for us by natives, and were dug from their holes in deep jungle. The immature specimen of which only the skull was preserved, was found in the same hole along with one of the females and an adult male, which escaped, and the remaining pair were captured together. Both the females contained a single fairly advanced embryo, so that it is evident that the young ones remain with their parents until the young of the succeeding year are born.

A wound from a porcupine's quill is considered by the Malays as very dangerous, and we were solemnly informed that if the quill penetrated as far as the first dark ring, the injury would inevitably prove fatal.

Locally this species is known as *landak*, the brush-tailed porcupine being called *landek*.'

56. **Atherura macroura** (Linn.)

Hystrix macroura, *Linn. Syst. Nat.* 1, p. 77 (1766).
Atheroura macroura (Linn.) *Flower*, *P.Z.S.* 1900, p. 364.

a. ♂. Kampong Jalor, Jalor. 14th November, 1901.

57. **Nemorhoedus swettenhami,** Butler

Nemorhoedus swettenhami, *Butler*, *P.Z.S.* 1900, p. 675.
Nemorhoedus sumatrensis (Shaw), *Flower*, *P.Z.S.* 1900, p. 370; *Bonhote*, *op. cit.*, p. 882.

2 ♀ (skins only).	Biserat, Jalor. 30th July, 1901.
Frontlet.	Purchased in Patani Town.
Frontlet.	Purchased from Hill Sakais, Temongoh, Upper Perak.

In these skins the whole animal is jet black, with the exception of the hairs along the mane, which are tawny at their tips and dirty white at their bases.

'The *kambing gurun* is, speaking relatively, quite a common animal in suitable localities throughout the Peninsula, though no more than one specimen has ever been shot by a European. Its favourite haunts are the precipitous limestone hills, thickly clad with jungle, that form a very characteristic feature in the landscape of many parts of the Peninsula, both on the East and West coasts. It is, however, by no means confined to such localities, for it was not uncommon on Bukit Besar, more especially on the precipitous South-Western face, and even at our encampment above Ban Sai Kau we heard the curious call, half-way between a bleat and a roar, of the male. By offering a liberal reward we managed to persuade some of the Biserat natives to snare us two specimens.'

58. Cervulus muntjac (Zimm.)

Cervus muntjac, *Zimm. Geog. Gesch.* II, p. 131 (1780).
Cervulus muntjac (Zimm.), *Flower, P.Z.S.* 1900, p. 371.

Six pairs of horns, Tanjong Luar, Jalor-Rhaman border, and the Jarum district of Rhaman (obtained from natives).

'The muntjac was evidently common on Bukit Besar, and its barking cry was often heard.'

59. Cervus unicolor, Bechst.

Cervus unicolor, *Becbst Allgem. Uebers d. vierfus, Thiere*, I, p. 112 (1700); *Flower, P.Z.S.* 1900, p. 372; *Bonhote, op. cit.*, p. 882.

Frontlet. Tanjong Luar, Jalor-Rhaman border.
Frontlet. Hulu Sungkei, South Perak.

'Obtained from natives. At Jahar, some distance inland from Biserat, we saw a nearly adult female of this species in the possession of the Siamese magistrate of the district.'

60. Tragulus javanicus canescens, Mill.

Tragulus canescens, *Mill. Proc. Biol. Soc. Wash.* XIII, p. 185 (1900).
Tragulus napu (F. Cuv.), *Flower, P.Z.S.* 1900, p. 374.

a. imp. sk. and skull. Grit, Upper Perak, April, 1902.

'This form is also common in the Batang Padang district, South Perak, and we saw two or three specimens at Gedong in the possession of natives. Speaking generally, this species is everywhere rarer than the succeeding, or possibly is not so much esteemed for food.'

61. Tragulus kanchil affinis, Gray

Tragulus affinis, *Gray, P.Z.S.* 1861, p. 138.

Tragulus javanicus (Gm. nec Osbeck), *Flower, P.Z.S.* 1900, p. 374 ; *Bonhote, op. cit.*, p. 883, and of authors generally.

Tragulus ravus, *Miller, Proc. Biol. Soc. Wash.* xv, p. 173 (1902).

a.	♀.	Mabek, Jalor.	28th July, 1901.
b.	♀.	Biserat, Jalor.	14th July, 1901.
c.	♀.	Rhaman.	14th July, 1901.
d-e.	♂, ♀.	Kampong, Jalor.	October, 1901.

In my recent paper on the genus I have shewn the reason for adopting Gray's name for this form of *T. kanchil.* It is, however, very closely allied to *T. fulviventer*, of which the exact locality is unfortunately doubtful. They may be distinguished from *T. fulviventer* by their slightly smaller size and paler coloration. The type of *T. fulviventer* has in addition a rufous transverse stripe under the throat at the apex of the triangular marking which connects the colour at either side of the neck.

'The Malays are acquainted with four species of *Tragulus*, which they state are quite distinct, viz. : the *Napu* (*T. javanicus*) ; the *Pelandok*, which is the present species ; the *Pelandok angin* (*wind chevrotain*),[1] which is said to be very rare and which we have not been able to identify ; and the *Kanchil*, which is much smaller than any of the other species, and may be the young of *T. kanchil.*

Throughout the Malay Peninsula *Traguli* of one species or another are extremely abundant, though so shy that they can rarely be captured, except by snaring. They do not seem to frequent nor seem to care for very thick jungle, frequenting by preference the bamboo forest that is very prevalent in certain localities, such as the Batang Padang Valley, between about 1500 and 3000 feet, and the country round Mabek, where we frequently saw specimens.'

62. Sus cristatus, Wagner

Sus cristatus, *Wagner, Munch. gel. Anz.*, p. 535 (1839) ; *Flower, P.Z.S.* 1900, p. 375.

Skin of head and skull, imm. ♀. Telôm, Perak Pahang boundary. January, 1902.

'This specimen was sold to us by some Sakais who had brought it up as a pet, and whom it followed about like a dog, coming to them when they called it, but foraging for itself in the jungle.'

63. Orcaella brevirostris (Owen)

Phocaena brevirostris, *Owen, Trans. Z.S.* vi, p. 24, pl. 4, figs. 1-3 (1866).

Orcaella brevirostris (Owen), *Anders. P.Z.S.* 1871, p. 143.

a. ♂ skeleton, nr. Patani. October, 1901.

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[1] Cf. *Fascic. Malay.—Anthropology —part* 1, p. 102.

'A school of five individuals of this species were enclosed in the fishermen's seine, on the sea face of Tanjong, Patani, and we secured two specimens. Unfortunately, one was washed away by an unusually high tide. The fishermen told us that they were often seen in Patani roads, and even crossed the bar of Patani River, but we never saw them except on this occasion. The specimens were both males, and were of a grey colour, between French grey and lead, slighter paler on the ventral surface.'

The dimensions, in millemetres, were as follows :—

	A	B
Length, snout to middle point of fluke	2200	2752
Breadth of fluke	600	657
Length of flipper	385	412
Anterior margin of flipper to anus	961	998
Anus to middle point of fluke	714	703
Girth at flippers	930	866
Girth at anus	714	760
Greatest Girth	1194	1250
From middle point of fluke to posterior margin of dorsal fin	938	922
Length of dorsal fin	144	182
Height of dorsal fin	64	70

'At Pak Yun, on the Taleh Sap (great lake), about half-way between Senggora and Lampam, I saw, on May 12, a school of five or six small cetaceans, apparently not much over four feet in length, and of an almost uniform rich chocolate brown (*Platanista* sp. ?). The water was here only very slightly brackish, the taste of salt being hardly perceptible. At the end of March, 1899, the 'Skeat' Expedition saw a school of similar cetaceans at almost exactly the same place, and the natives told me that it was always in the vicinity of the village, the lake being very narrow at this point.'—N.A.

'In the estuary of the Trang River, in salt water, I had a good view of a solitary cetacean, apparently about twice the size of those at Pak Yun, and of a uniform dead white colour. Its rostrum was only moderately elongated (*Sotalia sinensis ?*).'—N.A.

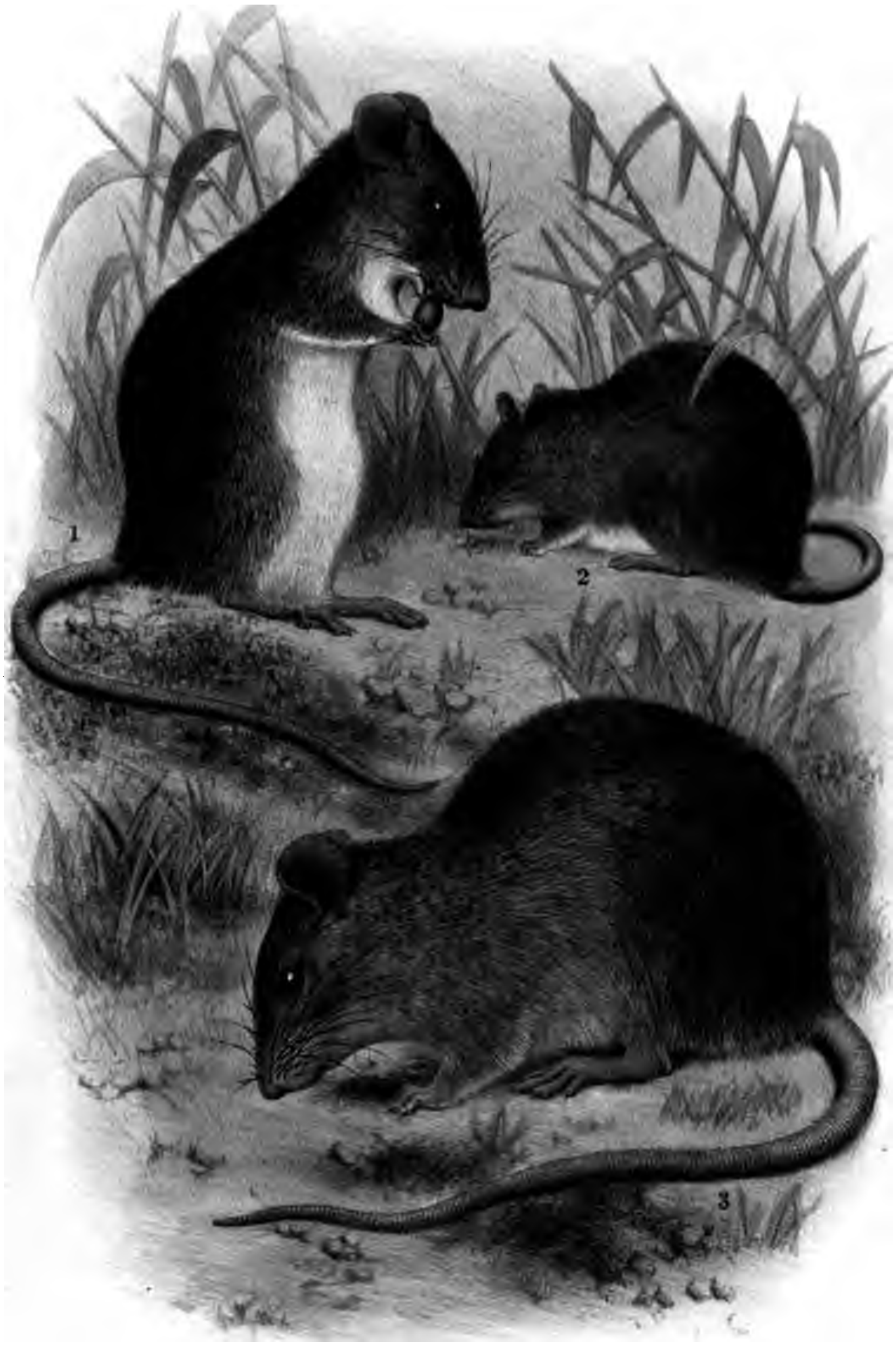
64. **Manis javanica**, Desm.

Manis javanica, *Desm. Mamm.* p. 377 (1822); *Flower, P.Z.S.* 1900, p. 378; *Bonhote, loc. cit.* p. 883.

a.	♂ ad.	Kampong Jalor, Jalor.	3rd November, 1901.
b, c.	♀ imm.	Ban Sai Kau, Nawngchik.	May, 1901.

In the two immature specimens the latter half, and in the adult the terminal third, of the tail is white.

PLATE II.

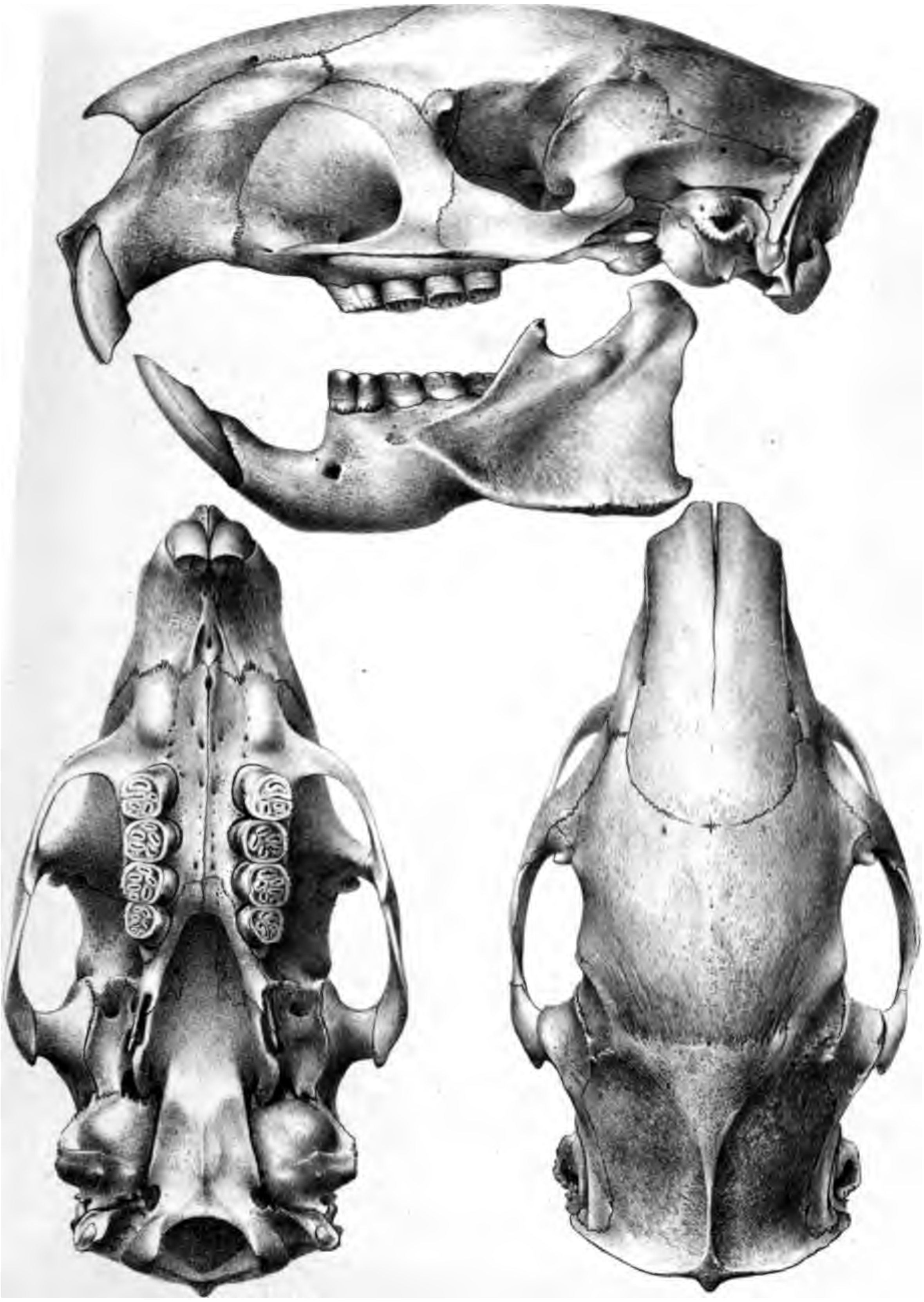


H. Goodchild del. et lith.

Mintern Bros. imp.

1. 2. MUS JALORENSIS.
3. MUS GRISEIVENTER.
⅔ nat. size.

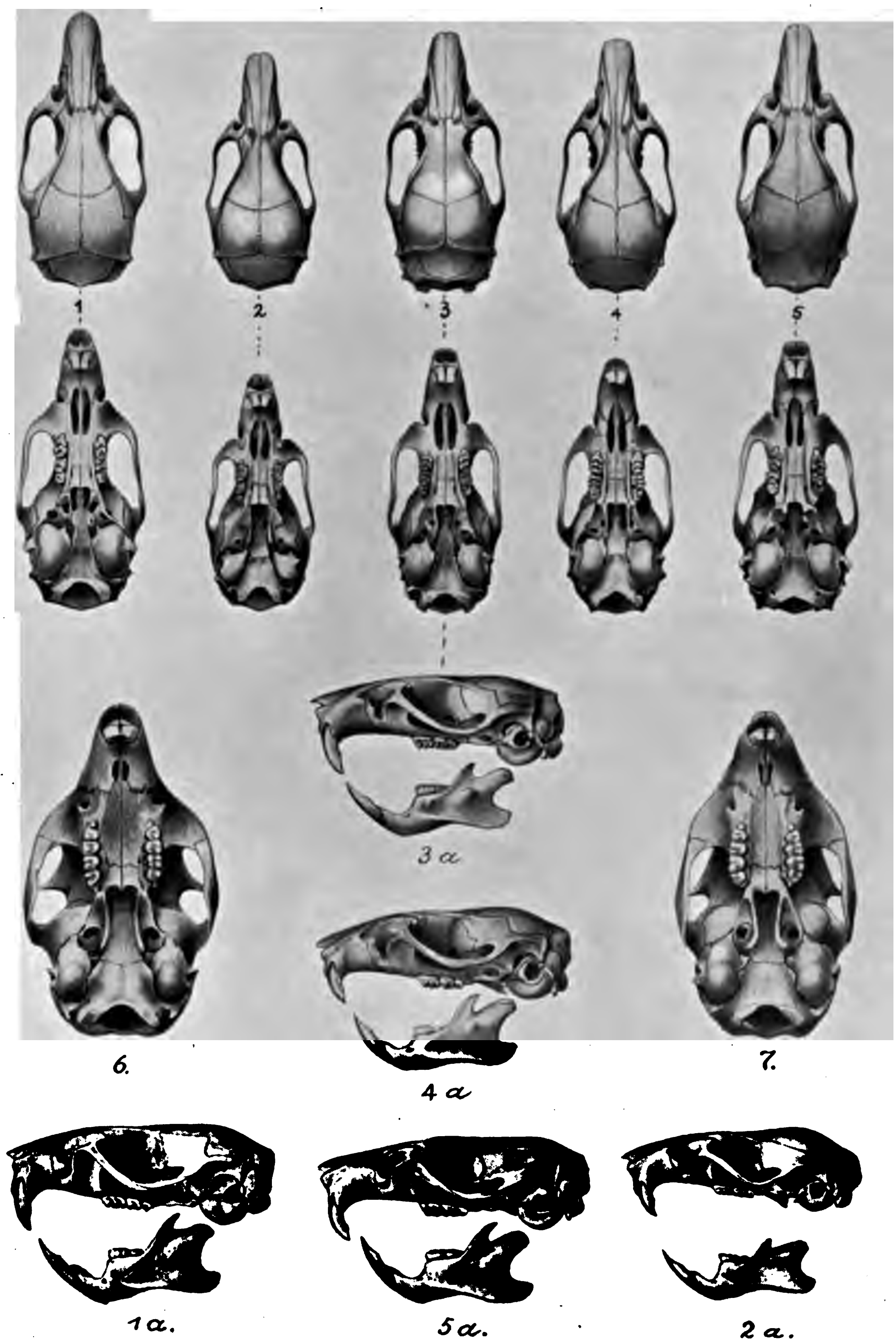
PLATE III.



H. Grönvold del. et lith.

Mintern Bros. imp.

HYSTRIX GROTEI, GRAY.
(NAT SIZE).



Skulls of *Sciurus* and *Mus* from the Malay Peninsula.

UNIV. OF MI

LEPIDOPTERA HETEROCERA

BY

Col. CHARLES SWINHOE, M.A., F.E.S.

REPORT ON THE HETEROCERA

By Colonel C. SWINHOE, M.A., F.E.S.

SPHINGIDAE

Chaerocampa, *Dup. Hist. Nat. Lep. Fr. Sys.*, p. 159, pl. 2 (1835).

1. Chaerocampa lineosa

Chaerocampa lineosa, *Walker*, viii, 144 (1856); *Butler*, *Ill. Het. Brit. Mus.* V, p. 9, pl. 79, fig. 7 (1881).

♂. Telôm, Perak-Pahang boundary. 4,000 feet. 22nd January, 1902.
♂. Telôm, Perak-Pahang boundary. 4,000 feet. 23rd January, 1902.

'We found this moth common at Telôm in January. On moonlight nights it flitted rapidly over the surface of the stream, especially over some stones standing in the water on which our men were in the habit of cleaning poultry. A considerable number of specimens of both sexes were always seen together, but they did not appear to be attracted by the light of our candles, and we never found them more than a few yards distant from the river.'

SATURNIIDAE

Attacus, *Hübner*, *Verz. Schmett.*, p. 155 (1818).

2. Attacus atlas

Phalaena atlas, *Linn. Mus. Lud. Ulr.*, p. 366 (1764).

1 ♂. Biserat, Jalor. July, 1901.
9 ♀. Biserat, Jalor. 27th July—1st August, 1901.

'Very common round Biserat in July and August; larvae feeding on a variety of shrubs and small trees. Also seen in South Perak in early spring.'

Actias, *Leach*, *Zool. Misc.* ii, p. 25 (1815).
Tropaea, *Hübner*, *Verz. Schmett.*, p. 152 (1818).
Plectropteron, *Hutton*, *Ann. Nat. Hist.* xvii, p. 60 (1846).

♂, ♀ (*in coitu*). Kampong Mabek, Jalor. 26th July, 1901.

'The members of this genus are generally found resting at no great distance from the ground, in fairly open country. Being of brilliant or conspicuous coloration, they make little, if any, attempt to conceal themselves, though they often take shelter from the mid-day heat under leaves or amidst foliage. They are very sluggish, and do not take to flight readily.'

Trichaeta, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 52 (1892).

11. Trichaeta albiplaga

Syntomis albiplaga, *Walker*, *Journ. Linn. Soc. London*, vi, p. 92 (1862).

1 ♂. Gedong, South Perak. 8th January, 1902.

Syntomis, *Ochs.*, *Eur. Schmett.* ii, p. 103 (1808).

12. Syntomis euryptera

Syntomis euryptera, *Hampson*, *Phal.* i, p. 87, pl. 3, fig. 10 (1898).

1 ♂. Bukit Besar, Nawngchik, 2,500 feet. 21st May, 1901.
1 ♂. Bukit Besar, Nawngchik, 2,500 feet. 25th August, 1901.

13. Syntomis divisa

Syntomis divisa, *Walker*, i, 131 (1854).

♂, ♀ (*In coitu*). Patani. 18th April, 1901.

14. Syntomis sperbius

Zygaena sperbius, *Fabr.*, *Mant. Ins.* ii, p. 103 (1787).
Syntomis sperbius, *Hampson*, *Phal.*, i, p. 106 (1898)

♂, ♀ (*In coitu*).	Patani.	18th April, 1902
1 ♂.	Biserat, Jalor.	16th July, 1902.
1 ♀.	Biserat, Jalor.	13th July, 1902.
1 ♀.	Mabek, Jalor.	22nd July, 1901.

'Common on shrubs at the edge of paths and in low undergrowth.'

Ceryx, *Wallgrn.*, *Wien. Ent. Mon.* vii, p. 140 (1863).

15. Ceryx transitiva

Syntomis transitiva, *Walker*, *Journ. Linn. Soc. London*, vi, p. 89 (1862).
Ceryx transitiva, *Hampson*, *Phal.* i, p. 45 (1898).

1 ♂. Telôm, Perak-Pahang boundary. 4,000 ft. 25th January, 1902.

'What has been said of *Eressa* is equally true of the representatives in the Malay Peninsula of the succeeding genera. Their coloration, often black, yellow and hyaline, combined with their form and the relative proportions of their bodies and wings, gives them a quite general resemblance to wasps.'

CHALCOSIIDAE

Pidorus, *Walker*, ii, 424 (1854).
Laurion, *Walker*, ii, 427.

16. Pidorus geminus

Laurion gemina, *Walker*, ii, 427.
Milleria bifasciata, *Walker*, *Journ. Linn. Soc. London*, vi, p. 99 (1862).

4 ♀. Biserat, Jalor. 3rd to 8th July, 1901.

'Common in July round Biserat. Rests during the day, sometimes in conspicuous positions, among the low undergrowth at the edge of secondary jungle. When disturbed, it either falls to the ground and lies still, or takes a rapid and jerky flight, which does not carry it very far from its original station. When at rest, its wings are folded in such a way that the posterior pair are completely concealed.'

Trypanophora, *Kollar*, *Hugel's Kaschmir*, iv, p. 457 (1844).

17. Trypanophora festinata

Trypanophora festinata, *Snellen*, *Deutsche Ent. Zeit. Lep.* viii, p. 131 (1895).

1 ♀. Bukit Besar, Nawngchik. 2,500 ft. 17th May, 1902.

Chalcosia, *Hübner*, *Verz. Schmett.*, p. 173 (1818).

18. Chalcosia coliadoides

Chalcosia coliadoides, *Walker*, *Journ. Linn. Soc. London*, vi, p. 87 (1862).

1 ♀. Biserat, Jalor. 3rd July, 1901.

'Flying in secondary jungle ; afternoon. Perhaps bears a generalized resemblance to certain *Pierinae*.'

Milleria, *Herr.-Schäff. Lep. Exot. Sp. Nov.* i, p. 4 (1853).

19. Milleria panthona

Phalaena panthona, *Cram.*, *Pap. Exot.* iv, pl. 322, fig. C (1780).

1 ♀. Patani. 9th October, 1901.

'On under surface of leaf.'

Cyclosia, *Hübner, Verz. Schmett.*, p. 177 (1818).
Pintia, *Walker*, ii, 280 (1854).

20. Cyclosia papilionaris

Phalaena papilionaris, ♀, *Drury, Ins. Exot.* ii, p. 4, pl. 2, fig. 4 (1773).
Phalaena venaria, ♀, *Fabr., Ent. Syst.* iii, 2, 156, 99 (1794).
Eterusia ferrea, *Walker*, ii, 431. ♂.

1 ♀.	Biserat, Jalor.	16th July, 1901.
1 ♀.	Biserat, Jalor.	6th July, 1901.
1 ♀.	Bukit Besar, Nawngchik (base of mountain).	29th May, 1901.

(These forms have been reared from the eggs of one female by Mr. Bell in India).

'This species is not uncommon in Jalor and Nawngchik, flying in the brightest sunshine about village plantations and at the edge of secondary jungle. Its flight closely resembles that of several species of *Danais*, and it evidently belongs to an association of Lepidoptera, which includes several butterflies of the sub-families *Danainae*, *Pierinae*, and *Papilioninae*, and which is characterized by the possession of broad wings of white or very pale dull green, grey or yellow, heavily veined with black, dark brown, or dark blue. We have taken certain of these butterflies in the same locality and habitat, and at the same time of day as *Cyclosia papilionaris*, but it should be noted that the individual variation in size of the species makes some specimens of the moth resemble the Rhopalocera more nearly than others.'

Gynautocera, *Guérin, Mag. Zool.*, 1831, *Ins.*, pl. 12.

21. Gynautocera zara

Gynautocera zara, *Swinhoe, Trans. Ent. Soc. London*, 1891, p. 476.

1 ♂. Biserat, Jalor. 9th August, 1901.

'Resting on tree-trunk ; afternoon. When pinned and set this insect bears a striking resemblance to the butterflies of the *Nox* group of the genus *Papilio*, especially to *P. erebus*, which it approaches most nearly in size ; the resemblance being due to the shape of the wings (though they are somewhat longer and narrower in the moth than in the butterfly), to their black colour, slightly relieved by a veined blotch of bluish white in the centre of the hind wings (though the obscure veining on the forewings is characteristic of the moth and not of *P. erebus*), and to the brilliant red coloration of the sides of the body and parts of the head (though its distribution is not quite the same in the butterfly as in the moth). If this is a case of true mimicry, or even of adaptive resemblance, and not one of coincidence, it can only be efficacious when the insects are on the wing, as the attitude of rest of the moth is different from that of any butterfly, its forewings being folded over its hind wings and held tightly pressed against the surface on which it is resting. *Papilio erebus* is a rare insect, which we did not collect, or, so far as I am aware, even see.'

Pompelon, *Walker*, ii, p. 413 (1854).

22. Pompelon rotundata

Pompelon rotundata, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 72 (1892).

1 ♀. Bukit Besar (?).

'Flying in clearing ; early morning.'

23. Pompelon valentula

Pompelon valentula, *Swinhoe*, *P.Z.S.* 1889, p. 401.

1 ♂. Biserat, Jalor. 21st October, 1901.

'Sitting on tree-trunk, mid-day. The resemblance between the two preceding species and butterflies of the genus *Euploea* is very striking, both as regards the form of their wings and their dark, blue-shot coloration, which fades into pale brown in places ; but the resemblance is probably generic rather than specific, and does not appear to be accompanied by any similarity of habits or resting attitude.'

Amesia, *Westw.*, *Arcana Ent.*, p. 20 (1841) ; *Nat. Library Ent.* vii, p. 93 (1841).

24. Amesia namouna

Gynautocera namouna, *Double.*, *Ann. Nat. Hist.* xix, p. 74 (1847).
Amesia namouna, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 78 (1892).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 3rd September, 1901.

'I took this specimen resting under a gingerwort leaf in the jungle. It made no attempt to escape, but when I touched it, a frothy, pale-yellow liquid gushed forth in great abundance, with a distinct hissing sound, from a minute pore on each side of the thorax, so that the moth, whose wings were partially expanded, was surrounded in a few seconds with this substance, which had a faint pungent odour. The bulk of the froth very soon exceeded that of the insect, which continued to emit it for some minutes, with redoubled vigour when touched. *Amesia namouna*, also, has something of a resemblance to the genus *Euploea*, but its habits would seem to differ from those of the butterflies, though it is very possible that the substance secreted by it may have a physiological relationship to the well-known noxious juice of this family of Rhopalocera.'

COSSIDAE

Duomitus, *Butler*, *Ann. Mag. Nat. Hist.* (5) vi, p. 68 (1880).

25. Duomitus mineus

Phalaena-Bombyx mineus, *Cram.*, *Pap. Exot.* ii, pl. 131, fig. D (1777).

1 ♂. Bukit Besar, Nawngchik. 1,000 feet. 27th April, 1901.

'Several other very much injured specimens were brought us by natives at Sai Kau. The specimen preserved was taken resting under the leaf of a tree, which grew just at the edge of primaeval jungle. The head of the moth was bent down below the level of the thorax, the antennae were quite concealed beneath the fore wings, which were folded and arched so as to make the dorsal surface rounded, and the first pair of legs were held stretched out in such a way as to resemble those of a beetle. I mistook the specimen, which made no attempt to escape, for some large Buprestid, and was surprised to find it soft to the touch. We did not capture any species of beetle to which this moth could be said to bear a definite resemblance; but Buprestids with a similar type of coloration (forepart of the body dark metallic green, wings or elytra, flame-colour or deep orange, boldly spotted with the same metallic shade) occur in the Malay Peninsula, and Mr. Richard Evans, of the Skeat Expedition, found on Bukit Besar a Longicorn—not yet described, but probably belonging to a new genus—which presents very much the same general appearance, though in shape it does not resemble the moth so closely as certain of the Buprestidae would do.'

Phragmataecia, *Newman*, *Zoologist* viii, p. 2931 (1850).

26. Phragmataecia castaneae

Bombyx castaneae, *Hübner*, *Beitr.* iii, p. 9, pl. 1, fig. C (1790).
Phragmataecia castaneae, *Hampson*, *Moths India* i, p. 313, (fig. 213) (1892).

1 ♂. Sungkei, South Perak. 9th February, 1902. (At light).

DREPANULIDAE

Problepsidis, *Hampson, Moths India* iv, p. 476 (1896).

27. Problepsidis ostia, nov.

♂. White, frons brown, antennae grey, rather broadly pectinated, shafts white; fore wings with a thin subcostal blackish band, running on to the costa near apex, with a white spot in it on the costa near the apex; internal, medial, and discal blackish lines from the hinder margin, all meeting near the apex, the space above the medial line smeared in parts with pale black, a small patch of this colour in the middle of the disc outside the outer line, also on the outer margin intermixed with a festoon of white; hind wings also with inner, medial, and discal lines, the first two corresponding to the last two on the fore wings, a smear of black outside both lines; the outer margin and cilia of both wings blackish; on the under side there is a black thick band across both wings and some black suffusion on the fore wings. Expanse of wings:—$1\frac{1}{10}$ inches.

1 ♂. Telôm, Perak-Pahang boundary. 4,000 ft. 24th January, 1902.

'Resting on leaf, with wings spread out flat and antennae concealed beneath them. Distantly resembled a bird's dropping.'

LIMACODIDAE

Parasa, *Moore, Cat. Lep. E.I.C.*, p. 413 (1859).

28. Parasa lepida

Phalaena noctua lepida, *Cram., Pap. Exot.* ii, pl. 130, fig. E (1777).

1 ♂. Patani. 10th October, 1901.
1 ♀. Patani. 8th October, 1901.

'Both specimens at light.'

29. Parasa dharma

Parasa dharma, *Moore, Cat. Lep., E.I.C.* ii, p. 414, pl. 11a, fig. 7 (1859).

1 ♂. Bidor, South Perak. 12th January, 1902. (At light).

Susica, *Walker*, v, 1114 (1855).

30. Susica pallida

Susica pallida, *Walker*, v, 1114.
Susica pallida, *Hampson, Moths India* i, p. 377, (fig. 257) (1892).

Selangor.

Miresa, *Walker*, v, 1123 (1855).

31. Miresa albipuncta

Nyssia albipuncta, *Herr.-Schäff.*, *Lep. Exot.* i, fig. 179 (1853).
Miresa albipuncta, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 232 (1892).

Selangor.

Narosa, *Walker*, v, 1151 (1855).

32. Naresa doenia

Parasa doenia, *Moore*, *Cat. Lep. E.I.C.* ii, p. 416, pl. 11a, fig. 10 (1859).

1 ♂. Jeram Kawan, South Perak. 15th January, 1902. (At light).

Altha, *Walker*, *Journ. Linn. Soc. London*, vi, p. 173 (1862).

33. Altha adala

Narosa adala, *Moore*, *Cat. Lep. E.I.C.* ii, p. 418, pl. 11a, fig. 14 (1859).

1 ♂. Mabek, Jalor. 27th October, 1901.

Natada, *Walker*, v, 1108 (1855).

34. Natada pallivitta

Miresa pallivitta, *Moore*, *Ann. Mag. Nat. Hist.* (4) xx, p. 93 (1877).
Miresa pallivitta, *Kirby*, *Cat. Het.* i, p. 549 (1892).

1 ♂. Sungkei, South Perak. 8th February, 1902.
1 ♂. Sungkei, South Perak. 6th February, 1902.

'Both specimens at light.'

Thosea, *Walker*, v, 1068 (1855).

35. Thosea rara

Thosea rara, *Swinhoe*, *P.Z.S.*, p. 408, pl. 43, fig. 9 (1889).

1 ♂. Biserat, Jalor. 18th October, 1901. (At light).

LYMANTRIIDAE

Orgyia, *Ochs.*, *Schmett. Eur.* iii, p. 298 (1810).

36. Orgyia turbata

Orgyia turbata, *Butler*, *Trans. Linn. Soc. London* (2) i, p. 560 (1879).

4 ♂. Biserat, Jalor. 1st July, 1901—13th July, 1901.

'All at light.'

Pantana, *Walker*, iv, 819 (1855).

37. Pantana visum

Liparis visum, *Hübner*, *Zutr.* iii, p. 33 (1825).
Pantana dispar, *Walker*, iv, 820 (1855).

1 ♂. Biserat, Jalor. 7th July, 1901.
1 ♂. Biserat, Jalor. 23rd October, 1901.

'One specimen flew into the house at mid-day, and settled on the wall with its wings raised and their dorsal surfaces applied to one another ; the other was taken on the wing in the open at mid-day.'

Leucoma, *Steph. Ill. Brit. Ent. Haust.* ii, p. 64 (1829).

38. Leucoma marginalis

Redoa marginalis, *Walker*, *Journ. Linn. Soc. London*, vi, p. 128 (1862).
Leucoma marginalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 202 (1892).

1 ♂. Biserat, Jalor. 1st July, 1901. (At light).
1 ♀. Bukit Besar, Nawngchik. 2,600 feet. 20th April, 1901.

'Resting on upper surface of leaf in jungle ; morning.'

39. Leucoma transiens

Redoa transiens, *Walker*, *Journ. Linn. Soc. London*, vi, p. 129 (1862).
Leucoma transiens, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 203 (1892).

Selangor.

Laelia, *Steph.*, *Ill. Brit. Ent. Haust.* ii, p. 62 (1829).

40. Laelia prolata

Laelia prolata, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 195 (1892).

1 ♀. Biserat, Jalor. 21st October, 1901.

'Resting on branch of herbaceous plant growing in the open ; early morning.'

Cobanilla, *Moore*, *Lep. Ceylon* ii, p. 120 (1883).

41. Cobanilla plumbacea, nov.

♂. Of a uniform plumbaceous grey colour, speckled with very fine silver scales ; fore wings with a black spot at end of cell, blackish costal line, a blackish spot on costa before apex, being the commencement of an irregular blackish, indistinct, discal band, represented on the hind wings by a blackish patch near the anal angle ; some blackish suffusion on the outer margin of the wings below apex and on hind wings below the middle ; under side ochreous grey, with some blackish suffusion inside the fore wings. Expanse of wings, $1\frac{1}{10}$ inches.

One example. Bukit Besar, Nawngchik, 2,500 feet. 5th May, 1901.

The shape of the wings is similar to *Cobanilla marginata*, MOORE, the type of the genus.

Numenes, *Walker*, iii, 662 (1855).
Pseudomesa, *Walker*, iv, 923 (1855).

42. Numenes siletti

Numenes siletti, *Walker*, iii, 663 (1855).
Pseudomesa quadriplagiata, *Walker*, iv, p. 923 (1855).

1 ♀. Biserat, Jalor. 8th July, 1901.

'Resting among low undergrowth at base of cliff.'

This example has on the costa the commencement of a subapical transverse band.

Euproctis, *Hübner*, *Verz. Schmett.*, p. 159 (1818).

43. Euproctis flavinata

Artaxa flavinata, *Walker*, xxxii, 331 (1865).

2 ♂. Biserat, Jalor. 17th October, 1901.
2 ♂. Biserat, Jalor. 8th July, 1901.
1 ♀. Telôm, Perak-Pahang boundary. 4,000 feet. 17th January, 1902.

'The males are not uncommon round Biserat, resting in conspicuous positions during the daytime ; the female was taken hovering over long grass at dusk, very much as the male of *Hepialus humuli* does in this country.'

44. Euproctis transversa

Artaxa transversa, *Moore, Cat. Lep. E.I.C.*, p. 352, pl. 9a, fig. 8 (1859).
Euproctis guttistriga, *Walker, Journ. Linn. Soc. London*, vi, p. 129 (1862).

2 ♀. Bukit Besar, Nawngchik. 2,500 feet. 24th August, 1901.
1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 7th May, 1901.
1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 2nd September, 1901.

'Mr. Robinson took two specimens resting on tree-trunks in jungle, and notes that they were very sluggish. I took another on the wing at dusk in similar environment.'

45. Euproctis munda

Euproctis munda, *Walker, Journ. Linn. Soc. London*, vi, p. 129 (1862).

1 ♀. Bidor, South Perak. February 2nd, 1902. (At light).

Lymantria, *Hübner, Verz. Schmett.*, p. 160, (1818).

46. Lymantria beatrix

Bombyx beatrix, *Stoll. Cram., Suppl. Pap. Exot.* v, p. 173, pl. 40, fig. 2 (1790).

1 ♀. Biserat, Jalor. 5th August, 1901. (At light).

Dasychira, *Steph. Ill. Brit. Ent. Haust.* ii, p. 58 (1829).

47. Dasychira horsfieldii

Arctia horsfieldii, *Saunders, Trans. Ent. Soc.* i, p. 162, pl. 12, fig. 1, 2 (1851).
Dasychira horsfieldii, *Swinhoe, Cat. Het. Mus. Oxon.* i, p. 220 (1892).

1. Telôm, Perak-Pahang boundary. 4,000 feet. 26th January, 1902.

'Found dead in jungle.'

AGANAIDAE

Peridrome, *Walker*, ii, 444 (1854).

48. Peridrome orbicularis

Hypsa (Peridrome) orbicularis, *Walker*, ii, 444 (1854).

2 ♂. Bukit Besar, Nawngchik. 2,500 feet. 1st and 2nd September, 1901.
5 ♀. Bukit Besar, Nawngchik. 2,500 feet. 28th August and 3rd September, 1901.
1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 31st August, 1901.

The last female is curiously marked on the hind wings, the discal spots being joined together by a thin black band, which is acutely elbowed above the middle, and joins the black spot at the upper end of the cell.

'We did not take this species on our first visit to Bukit Besar, in April and May, but it was very common in the jungle round our clearing (2,500 feet) in August and September. Lower down the mountain it became scarcer, and we did not see it much below a thousand feet. It would appear to be essentially a jungle species, and its absence from, or comparative rarity on, the lower slopes may not be entirely due to inferior altitude, but also to the fact that large clearings have at one time existed on them.

Peridrome orbicularis rests during the day below the large leaves of the gingerworts and other plants of similar growth, whence it issues forth towards dusk; the readiness with which it is disturbed and its strength on the wing causing it falsely to appear to be a diurnal species.'

Anagnia, *Walker*, ii, 446 (1854).

49. Anagnia subfascia

Hypsa (Peridrome) subfascia, *Walker*, ii, 446.

2 ♂.	Bukit Besar, Nawngchik.	2,500 feet.	3rd September, 1901, and August, 1901.
3 ♀.	Bukit Besar, Nawngchik.	2,500 feet.	24th August, 1901-30th August, 1901.
1 ♀.	Bukit Besar, Nawngchik.	3,000 feet.	27th August, 1901.

'On Bukit Besar this species closely resembles *Peridrome orbicularis* in habits and distribution, as it does in appearance. One male was taken on the wing in bright moonlight, at the edge of our little clearing.'

Euplocia, *Hübner*, *Verz. Schmett.*, p. 172 (1818)

50. Euplocia membliaria

Phalaena membliaria, *Cram.*, *Pap. Exot.* iii, pl. 269, fig. C, D (1780).

1 ♂.	Tanjang Luar, borders of Jalor and Rhaman.	13th October, 1901.
1 ♂.	Between Anak Bukit and Sai Kau, Nawngchik.	26th May, 1901.
1 ♂.	Bukit Besar, Nawngchik. 2,500 feet.	2nd September, 1901.
1 ♀.	Between Anak Bukit and Sai Kau, Jalor.	26th May, 1901.
1 ♀.	Tanjang Luar, borders of Jalor and Rhaman.	13th October, 1901.
1 ♀.	Bukit Besar, Nawngchik. 1,000-2,000 feet.	23rd August, 1901.

'All these specimens were taken in thick jungle, and the species apparently resembles *Anagnia subfascia* and *Peridrome orbicularis* in habits.'

Neochera, *Hübner*, *Verz. Schmett.*, p. 173 (1818).

51. Neochera butleri

Neochera butleri, *Swinhoe*, *Cat. Het. Mus. Oxon.* i, p. 84 (1892).

Neochera marmorea, *Butler*, ♀ *only (nec Walker)*, *Ill. Het. B.M.* v, p. 43, pl. 87, fig. 11 (1881).

4 ♂.	Biserat, Jalor.		3rd and 9th July, 1901.
4 ♂.	Bukit Besar, Nawngchik.	1,000, 2,000, and 2,500 feet.	28th August, 1901.
4 ♂.	Bukit Besar, Nawngchik.	1,000, 2,000, and 2,500 feet.	7th September, 1901.
2 ♂.	Ban Sai Kau, Nawngchik.		14th September, 1901.
3 ♀.	Biserat, Jalor.		9th and 15th July, 1901.
1 ♀.	Bukit Besar, Nawngchik.	2,500 feet.	30th August, 1901.
2 ♀.	Ban Sai Kau, Nawngchik.		9th July, 1901, and 16th September, 1901.
1 ♀.	Gedong, South Perak.		7th January, 1902.

'This species is exceedingly common, especially in the summer months, in the plains of the Patani States. On Bukit Besar it occurs as high as 2,500 feet, but is not common above 1,000 feet. It becomes scarcer in the thickly wooded central region of the Peninsula, and is comparatively rare in Perak. Like the preceding members of its family, it conceals itself during the day beneath leaves, but the foliage it selects belongs to the low trees that constitute recent secondary jungle. Its flight is strong, and it is very easily disturbed.'

52. Neochera bhawana

Neochera bhawana, *Moore*, *Cat. Lep. E.I.C.* ii, p. 295, pl. 7a, fig. 4, ♂ (1859).

1 ♂, 1 ♀.	Bukit Besar, Nawngchik.	2,500 feet.	7th September, 1901.

Asota, *Hübner*, *Verz. Schmett.*, p. 164 (1818).
Hypsa, *Hübner*, *loc. cit.* p. 172.

53. Asota caricae

Noctua caricae, *Fabr.*, *Syst. Ent.* p. 596, 23 (1775).
Phalaena Attacus alciphron, *Cram.*, *Pap. Exot.* ii, p. 58, pl. 133, fig. E (1777).

1 ♂.	Jambu, Jhering.	6th June, 1901.
1 ♂.	Biserat, Jalor.	29th June, 1901.
1 ♂.	Biserat, Jalor.	14th July, 1901.
1 ♀.	Sungkei, South Perak.	6th January, 1902.

'Two specimens were taken resting under leaves in the jungle during the day, and two, a male and a female, flew into the house at night, though they did not seem to be attracted by our light. I noticed, in one instance, that the geckos, which were hunting other moths on the ceiling, appeared to avoid this species. The flight is feeble.'

54. Asota egens

Hypsa egens, *Walker*, ii, 453 (1854).
Asota egens indica, *Rothsch.*, *Nov. Zool.* iv, p. 321 (1897).

1 ♀. Biserat, Jalor. 14th July, 1901.

This is Rothschild's *indica* form with six black spots on the under side of the hind wings.

'Mr. Robinson took the specimen among shrubs on the roadside, at dusk; I disturbed another during the day among the undergrowth at the base of a limestone cliff.'

55. Asota anawa, nov.

♂, ♀. The male is like *A. strigivenata*, Butler, above, but the wings are much shorter; below, the white basal portion of the fore wings is more limited, the brown apical third being clearly defined with an acute excavation in its centre. The female is like *A. caricae*, Fabr., but all the veins of the fore wings are white and are clearly defined; the hind wings have the commencement of the marginal band at the apex, and three black spots, one at the apex of the cell and two in the disc; below, the fore wings are white for two-thirds from the base, the apical third brown with a sinuous inner margin, but clearly defined, the hind wings as above, but with the apical band not so macular. Expanse of wings :—$2\frac{1}{10}$ inches.

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 29th August, 1901.
1 ♀. Bukit Besar, Nawngchik. 2,500 feet. ?
1 ♀. Biserat, Jalor. 16th July, 1901.

'The male was taken on the wing in bright moonlight, at the edge of the clearing, but in deep jungle. One female was resting on dead leaves on the jungle floor during the day, and was very inconspicuous.'

Deilemera, *Hübner*, *Verz. Schmett.*, p. 178, (1818).

56. Deilemera tripunctaria

Phalaena tripunctaria, *Linn. Syst. Nat.* x, p. 523 (1758).
Phalaena petulca, *Sparm.*, *Amoen. Acad.* xii, p. 500 (1769).
Nyctemera atralba, *Hübner*, *Verz. Schmett.*, p. 178 (1818).
Nyctemera sumatrensis, *Heylaerts*, *Compt. Rend*, *Soc. Ent. Belg.* xxxiv, p. 17 (1890).

1 ♀. Biserat, Jalor. 15th July, 1901.
2 ♂. Jarum, Rhaman. 22nd April, 1902.
1 ♀. Telôm, Perak-Pahang boundary. 4,000 feet. 27th January, 1902.

'Common on wing in jungle; day-time.'

57. Deilemera harca

Leptosoma harca, *Swinhoe*, *Ann. Mag. Nat. Hist.* (6) xii, p. 215 (1893).

1 ♀. Jambu, Jhering. 6th June, 1901.

'Flying among shrubs; morning. Flight swift and sustained.'

58. Deilemera coleta

Phalaena coleta, *Cram.*, *Pap. Exot.* iv, pl. 368, fig. H (1781).

1 ♀.	Bukit Besar, Nawngchik.	2,500 feet.	12th May, 1901.
1 ♀.	Bukit Besar, Nawngchik.	2,500 feet.	4th May, 1901.
1 ♀.	Gedong, South Perak.		7th January, 1902.

'Not uncommon in small clearings surrounded by jungle. Flies chiefly in the evening, concealing itself among long grass in the heat of the day.'

ARCTIIDAE

Maenas, *Hübner*, *Verz. Schmett.*, p. 167 (1818).

59. Maenas maculifascia

Spilosoma maculifascia, *Walker*, iii, 676 (1855).
Alpenus maculifascia, *Semper*, *Schmett. Philipp.* ii, pl. 56, figs. 9, 10 (1899).

1 ♂. Sungkei, South Perak. 6th February, 1902. (At light).

Diacrisia, *Hübner*, *Verz. Schmett.*, p. 169 (1818).

60. Diacrisia strigatula

Diacrisia strigatula, *Walker*, iii, 613 (1855).

1 ♀. Biserat, Jalor. 29th June, 1901.

'Laid 165 pale-green, almost spherical eggs in pill box. They were somewhat flattened at the base.'

61. Diacrisia brunnea

Arctia brunnea, *Heylaerts*, *C.R. Soc. Ent. Belg.* xxiv, p. xxix (1890).
Diacrisia brunnea, *Hampson*, *Phal.* iii, p. 304, pl. 45, fig. 18, ♂ (1901).

1 ♀. Bidor, South Perak. 4th February, 1902.

I think I am correct in my identification, but HEYLAERTS' type is a unique male, and this example is a female; the dorsal band is macular and not a stripe as in the male, but otherwise the description and the figure both correspond.

Barsine, *Walker*, ii, 546 (1854).

71. Barsine lineata

Ammatho lineatus, *Walker*, iii, 760 (1855).
Miltochrista lineata, *Hampson*, *Phal.* ii, p. 482 (1900).

Selangor.

Lambula, *Walker*, xxxv, 1890 (1868).

72. Lambula pallida

Lambula pallida, *Hampson*, *Phal.* ii, p. 100, pl. 20, fig. 18 (1900).

1 ♀. Biserat, Jalor. 17th July, 1901. (At light).

Eugoa, *Walker*, xii, 768 (1857).

73. Eugoa bipuncta

Paidia bipuncta, *Heylaerts*, *C.R. Soc. Ent. Belg.* xxxv, p. ccccxiv (1891).*
Eugoa bipuncta, *Hampson*, *Phal.* ii, p. 547, pl. 34, fig. 6 (1900).

1 ♀. Biserat, Jalor. 7th July, 1901. (At light).

AGARISTIDAE

Eusemia, *Dalm.*, *Mon. Castniae*, p. 26 (1825).

74. Eusemia fasciatrix

Eusemia fasciatrix, *Westw.*, *Cab. Or. Ent.*, p. 67 (1848).
Eusemia bijugata, *Walker*, *Journ. Linn. Soc. London*, vi, p. 85 (1862).
Eusemia communicans, *Walker*, xxxi, 50 (1864).
Eusemia darocana, *Druce*, *Ann. Mag. Nat. Hist.* (6) xiv, p. 23 (1894).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 2nd September, 1901. 'Nat. coll.'

NOCTUINA

TRIFIDAE

Ancara, *Walker*, xv, 1714 (1858).

75. Ancara obliterans

Ancara obliterans, *Walker*, xv, 1715.

1 ♀. Sungkei, South Perak. 10th January, 1902. (At light).

Zalissa, *Walker*, xxxiii, 936 (1865).

76. Zalissa transiens

Eusemia transiens, *Walker*, vii, 1588 (1856).

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Spodoptera, *Guenée*, *Noct.* i, p. 153 (1852).

77. Spodoptera mauritia

Hadena mauritia, *Boisd.*, *Faun. Madag. Lep.*, p. 92 (1834).
Spodoptera nubes, *Guenée*, *loc. cit.*, p. 155, 246.

1 ♂. Biserat, Jalor. 7th July, 1901. (At light).
1 ♀. Biserat, Jalor. 3rd July, 1901. „

Ilattia, *Walker*, xvi, p. 208, (1859).

78. Ilattia leucospila

Perigea leucospila, *Walker*, xxxii, 643 (1865).

1 ♂. Biserat, Jalor. 29th June, 1901. (At light.

Diethusa, *Walker*, xvi, 205 (1858).

79. Diethusa consentana

Eutelia consentana, *Walker*, *Journ. Linn. Soc. London*, vii, p. 68 (1864).
Plusia detegens, *Walker*, *loc. cit.*, p. 72.
Diethusa emiliusalis, *Swinhoe* (*part*), *Cat. Het. Mus. Oxon.* ii, p. 38 (1900).

1 ♂. Sungkei, South Perak. 11th February, 1902. (At light).

I made this species a synonym of *emiliusalis* in the *O.M. Cat.* for want of material, but, having received since many examples of both sexes from Borneo and Perak, I find there are two distinct species : *emiliusalis* = *ventralis*, and *consentana* = *detegens*.

Caradrina, *Ochs.*, *Eur. Schmett.* iv, p. 80 (1816).

80. Caradrina exigua

Noctua exigua, *Hübner*, *Samml. Eur. Schmett. Noct.*, fig. 362 (1810).

1 ♂. Biserat, Jalor. 19th October, 1901. (At light).

81. Caradrina transversa

Tyracona transversa, *Moore*, *Lep. Atk.*, p. 95, pl. 4, fig. 5 (1882).
Caradrina transversa, *Hampson*, *Moths India* ii, p. 262 (1894).

Bidor, South Perak. 22nd February, 1902.

'Resting on tree-trunk; mid-day.'

Leucania, *Ochs.*, *Eur. Schmett.* iv, p. 81 (1816).

82. Leucania decisissima

Leucania decisissima, *Walker*, xxxii, 624 (1865).

1 ♂. Biserat, Jalor. 15th July, 1901.

'Resting on under surface of leaf in clearing, with abdomen and greater part of wings protruding from shelter, so that the metallic lustre on the ventral surface of the latter was conspicuously displayed.'

83. Leucania consimilis

Leucania consimilis, *Moore*, *P.Z.S.* 1881, p. 336, pl. 57, fig. 10.

1 ♀. Biserat, Jalor. 1st July, 1901. (At light).

ACONTIIDAE

Erastroides, *Hampson*, *Ill. Het. B.M.* ix, p. 98 (1893).

84. Erastroides curvifascia

Ozarba (?) curvifascia, *Hampson*, *loc. cit.*, viii, p. 76, pl. 145, fig. 23 (1891).

1 ♂. Biserat, Jalor. 30th June, 1901.

Xanthoptera, *Guenée*, *Noct.* ii, p. 240 (1852).

85. Xanthoptera quintana

Acontia quintana, *Swinhoe*, *P.Z.S.* 1885, p. 455, pl. 27, fig. 13.

1 ♂. Biserat, Jalor, 12th July, 1901. (At light).

Acontia, *Ochs.*, *Eur. Schmett.* iv, p. 91 (1816).

86. Acontia intersepta

Xanthodes intersepta, *Guenée*, *Noct.* ii, p. 212 (1852).

1 ♀. Biserat, Jalor. 29th June, 1901.

'Mr. Robinson's note—'Flying among bushes, late on a sunny afternoon, in open country.'

Cerynea, *Walker*, xix, 878 (1859).

87. Cerynea divisa

Selenis divisa, *Walker, Trans. Ent. Soc. London* (3) i, p. 107 (1862).
Cerynea divisa, *Swinhoe, Cat. Het. Mus. Oxon.* ii, p. 69 (1900).

1 ♀. Jambu, Jhering. 6th June, 1901.

'Lying flat on leaf, with wings spread out, and their inner margin covering the abdomen.'

PALINDIDAE

Nertobriga, *Walker, Journ. Linn. Soc. London*, vii, p. 75 (1864).
Doranaga, *Moore, Lep. Ceylon* iii, p. 553 (1884).

88. Nertobriga signata

Ariolica (?) signata, *Walker, loc. cit.*, p. 54.
Nertobriga signata, *Swinhoe, Cat. Het. Mus. Oxon.* ii, p. 74 (1900).

1 ♀. Biserat, Jalor. 2nd July, 1901.

'On wall of house ; late afternoon.'

Maetamene, *Hampson, MS. ined.*

89. Maetamene atrigutta

Lyclene atrigutta, *Walker, Journ. Linn. Soc. London*, vi, p. 116 (1862).

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SARROTHRIPIDAE

Gadirtha, *Walker*, xiii, 1102 (1857).

90. Gadirtha inexacta

Gadirtha inexacta, *Walker*, xiii, 1102.

1 ♂. Biserat, Jalor. 15th July, 1901.
1 ♀. Biserat, Jalor. 22nd October, 1901.

'Both at light.'

Aquis, *Walker*, xv, 1652 (1858).

91. Aquis viridisquama

Aquis viridisquama, *Walker*, xv, 1652.
Aquis viridisquama, *Swinhoe, Cat. Het. Mus. Oxon.* ii, p. 82 (1900).

Selangor.

Hyblaea, *Fabr.*, *Ent. Syst.* iii (2), p. 127 (1794).

92. Hyblaea firmamentum

Hyblaea firmamentum, *Guen.*, *Noct.* ii, p. 392, 1253 (1852).

1 ♂. Biserat, Jalor. 19th October, 1901.

'On flowering shrub, with many other insects.'

1 ♂. Biserat, Jalor. 20th October, 1901.

The first has no spots on the hind wings above, but I have a similar example from Assam.

'This moth is common in the day-time on the banks of the stream that separates Jalor from Rhaman, at Tanjang Luar. Here it rests on the gravel, the small pools in which are also visited by enormous numbers of butterflies. When the wings are folded it closely resembles a small, damp pebble, owing to the peculiar way in which the fore wings are arched when at rest, and to their shining, brown surface; but, when approached, it betrays itself by suddenly flying for a short distance in a very circuitous and jerky manner.'

EUTELIIDAE

Anuga, *Guen.*, *Noct.* ii, p. 307 (1852).

93. Anuga constricta

Anuga constricta, *Guen.*, *loc. cit.*, p. 308, 1116.

1 ♂. Bidor, South Perak. 19th February, 1902. (At light).
1 ♀. Sungkei, South Perak. 6th January, 1902. (At light).

Targalla, *Walker*, xiii, 1007 (1857).

94. Targalla delatrix

Penicillaria delatrix, *Guen.*, *Noct.* ii, p. 304, 1112 (1852).

1 ♂. Bidor, South Perak. 10th February, 1902. (At light).

STICTOPTERIDAE

Gyrtona, *Walker*, xxvii, 89 (1863).

95. Gyrtona conglobalis

Gyrtona conglobalis, *Walker*, xxvii, 92 (1863).

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96. Gyrtona hylusalis

Gyrtona hylusalis, *Walker*, xxvii, 93 (1863).
Gyrtona hylusalis, *Hampson*, *Moths India* ii, p. 405 (1894).

Selangor.

Stictoptera, *Guen.*, *Noct.* iii, p. 51 (1852).

97. Stictoptera huma, nov.

♀. Palpi ochreous, last joint brown; head, thorax, and abdomen dark brown, thorax with pale pink markings; ground colour of fore wings pinkish white; some pale points on costa, a brown spot on costa near base, a brown, straight, and somewhat diffused band at one third; the outer third of the wing dark brown, with three lunular whitish lines on it, with dark brown outer edges; hind wings white, with a costal dark brown border, and a very broad border on the outer margin, veins also dark brown. Expanse of wings, $\frac{8}{10}$ inch.

Biserat, Jalor. 10th July, 1901. (At light).

GONOPTERIDAE

Cosmophila, *Boisd.*, *Faun. Ent. Madag.*, p. 94 (1833).

98. Cosmophila xanthindyma

Cosmophila xanthindyma, *Boisd.*, *loc. cit.*, pl. 13, fig. 7.

1 ♂. Biserat, Jalor. 4th July, 1901. (At light).

Carea, *Walker*, x, 474 (1856).

99. Carea robinsoni, nov.

♀. Palpi above, head, thorax, and fore wings dark bright pink red; palpi beneath and some spots behind the head white; fore wings with a white mark, composed of two or three dots at the end of the cell, three transverse bands formed by three clusters of white specks, and with a thick and prominent band of these specks near the outer margin; cilia with white spots, and towards hinder angle with white tips; hind wings white, the principal veins pink, and a pink patch at the apex; the colour runs down the outer margin and inwards on some of the veins; a pink interline in the white cilia; abdomen pink above, with white segmental lines, white tip, sides, and underside. Expanse of wings, 1$\frac{1}{10}$ inches.

Semangko Pass, Selangor-Pahang boundary. 2,700 feet. May, 1902.

QUADRIFIDAE

Patula, *Guen.*, *Noct.* iii, p. 176 (1852).

100. Patula macrops

Phalaena-attacus macrops, *Linn.*, *Syst. Nat.* (12) iii, p. 225 (1769).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 31st August, 1901.
1 ♀. Mabek, Jalor. 25th July, 1901.

'This species is not uncommon in thick jungle in the Patani States, and is frequently disturbed as one forces one's way through undergrowth. It rests in dark places, with its wings spread out flat, and is most inconspicuous. One specimen was captured on the wing at night.'

Argiva, *Hübner*, *Verz. Schmett.*, p. 272 (1818).

101. Argiva hieroglyphica

Phalaena-noctua hieroglyphica, *Drury*, *Ins. Exot.* ii, p. 3, pl. 2, fig. 1 (1773).

1 ♀. Biserat, Jalor. 3rd July, 1901.

'Resting among long grass at edge of jungle ; afternoon.'

1 ♂. Mabek, Jalor. 22nd July, 1901.

'Dull morning ; among low bushes in open ground.'

102. Argiva caprimulgus

Noctua caprimulgus, *Fabr.*, *Sp. Ins.* ii, p. 210, 6 (1789).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 6th May, 1901.

'On roof of hut ; night.'

Agonista, *Rogenhof*, *Feld. Reise. Nov. Lep.*, pl. 113, fig. 5, and explanation of plate (1869).

103. Agonista ciliata

Lygniodes ciliata, *Moore*, *P.Z.S.* 1867, p. 69.
Agonista ciliata, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 118 (1900).

3 ♂. Bukit Besar, Nawngchik. 2,500 feet. 2nd May, 1901.

'Flew into hut at night.'

Ericeia, *Walker*, xiii, 1089 (1857).

104. Ericeia eriophora

Hulodes eriophora, *Guen.*, *Noct.* iii, p. 210, 1611 (1852).

1 ♂. Biserat, Jalor. 4th July, 1901. (At light).
1 ♀. Biserat, Jalor. 1st July, 1901. (At light).

Two very small examples, but otherwise quite typical.

105. Ericeia fraterna

Girpa fraterna, *Moore*, *Lep. Ceylon* iii, p. 94, pl. 156, figs. 5, 5a (1885).

1 ♂. Biserat, Jalor. 30th June, 1901.

'In room of house ; mid-day.'

2 ♀. Biserat, Jalor. 10th July, 1901. (At light).

This species can easily be distinguished by the round lobe on the hinder margin of the fore wings.

Panilla, *Moore*, *Lep. Ceylon* iii, p. 93, (1885).

106. Panilla dispila

Homoptera dispila, *Walker*, xxxiii, 890 (1865).

1 ♂. Biserat, Jalor. 13th July, 1901. (At light).

Aedia, *Hübner*, *Verz. Schmett.*, p. 260, (1818).
Anophia, *Guen.*, *Ann. Soc. Ent. Fr.* x, p. 81 (1841).

107. Aedia acronyctoides

Anophia acronyctoides, *Guen.*, *Noct.* iii, p. 47, 1378 (1852).

1 ♀. Biserat, Jalor. 8th July, 1901.

'At sunset; resting, with wings partially expanded, on trunk of an Areca palm, with the bark of which it harmonized exactly.

Lacera, *Guen.*, *Noct.* iii, p. 336 (1852).

108. Lacera alope

Phalaena-noctua alope, *Cram.*, *Pap. Exot.* iii, pl. 286, figs. E, F (1782).

3 ♀. Biserat, Jalor. 29th June and 3rd July, 1901. (At light).

Achaea, *Hübner*, *Verz. Schmett.*, p. 269 (1818).

109. Achaea melicerte

Phalaena-noctua melicerte, *Drury*, *Ill. Exot. Ins.* i, p. 46, pl. 23, fig. 1 (1770).

1 ♂. Patani. 23rd June, 1901.

'Resting on under surface of tiles of roof in town ; late afternoon.'

Ophiusa, *Ochs., Eur. Schmett.* iv, p. 93 (1816).

110. Ophiusa arcuata

Ophiusa arcuata, *Moore, P.Z.S.* 1877, p. 609.

1 ♀. Biserat, Jalor. 1st July, 1901. (At light).
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111. Ophiusa onelia

Naxa onelia, *Guen., Noct.* iii, p. 258, 1679 (1852).

1 ♂. Biserat, Jalor. 1st July, 1901. (At light).

Thyas, *Hübner, Sammel. Exot. Schmett.* ii, p. 4 (1806).

112. Thyas honesta

Thyas honesta, *Hübner, loc. cit.*, fig. 1.

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 13th May, 1901.

'Sitting on jungle floor; late afternoon. Hind wings and body concealed beneath fore wings.'

113. Thyas dotata

Noctua dotata, *Fabr. Ent. Syst.* iii (2), p. 55, 153 (1794).

1 ♀. Biserat, Jalor. 28th June, 1901. (At light).

Anereuthina, *Hübner, Zutr.* ii, p. 21, No. 163 (1823).

114. Anereuthina lilach

Hypaetra lilach, *Guen., Noct.* iii, p. 260, 1688 (1852).
Anereuthina lilach, *Swinhoe, Cat. Het. Mus. Oxon.* ii, p. 148 (1900).
Hypaetra ocularia, *Swinhoe, Trans. Ent. Soc. London*, 1890, p. 246, pl. 8, fig. 4.

1 ♀. Biserat, Jalor. 29th June, 1901. (At light).

Bocula, *Guen., Noct.* iii, p. 295 (1852).
Borsippa, *Walker*, xv, 1756 (1858).

115. Bocula hypenoides

Cosmia hypenoides, *Moore, P.Z.S.* 1881, p. 354, pl. 38, fig. 19.

1 ♀. Biserat, Jalor. 28th June, 1901. (At light).

Remigia, *Guen., Noct.* iii, p. 312 (1852).

116. Remigia frugalis

Noctua frugalis, *Fabr., Syst. Ent.* iii, 2, p. 138, vi, p. 601 (1775).

1 ♀. Jeram Kawan, South Perak. 13th February, 1902. (At light).

Platyja, *Hübner, Verz. Schmett.*, p. 268 (1818).

117. Platyja sada, nov.

♀. Of a uniform dark olive brown; fore wings with an erect line of white points at one-third, another a little beyond, not reaching costa, and a third just beyond the middle from a white costal spot curving outwards, and ending in the middle of the wing; four or five white points on the costa before the apex; an indistinct, sinuous row or line of white dots in the disc of both wings, more apparent on the hind wings; a row of white dots pointed with black, close to the margin of both wings; marginal line pale; under side pale brown, with two transverse sinuous brown lines, discal on fore wings, medial on hind, and rather close together; fore wings with a distinct angle in the centre of the outer margin. Expanse of wings, $1\frac{8}{10}$ inches.

Semangko Pass, Selangor-Pahang boundary. 2,700 feet. May, 1902

Amphigonia, *Guen., Noct.* iii, p. 337 (1852).

118. Amphigonia hepatizans

Amphigonia hepatizans, *Guen., loc. cit.*, p. 338, pl. 24, fig. 12.

1 ♂. Biserat, Jalor. 30th June, 1901. (At light).

Ophideres, *Boisd., Faun. Ent. Madag. Lep.*, p. 99 (1834).

119. Ophideres fullonica

Phalaena-noctua fullonica, *Linn., Syst. Nat.* ii, p. 812, 16 (1759).

2 ♀. Biserat, Jalor. 29th June, 1901, and 6th July, 1901.

'One specimen at light, in house; one flew into house at mid-day, and rested on wall.'

120. Ophideres discrepans

Ophideres discrepans, *Walker*, xiii, 1227 (1857).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet. (At light, in hut).
1 ♀. Sungkei, South Perak. 6th February, 1902.

121. Ophideres salaminia

Phalaena-noctua salaminia, *Cram.*, *Pap. Exot.* ii, pl. 174, fig. A (1779).

4 ♀. Biserat, Jalor. 27th June and 8th July, 1901. (At light).

Arsacia, *Walker*, xxxiv, 1259 (1865).

122. Arsacia saturalis

Arsacia saturalis, *Walker*, xxxiv, 1260

1 ♂. Jambu, Jhering. 5th June, 1901.

'Flying among bushes; evening.'

Plusia, *Ochs.*, *Schmett. Eur.* iv, p. 89 (1816).

123. Plusia agramma

Plusia agramma, *Guen.*, *Noct.* ii, p. 327, 1136 (1852).

1 ♂. Biserat, Jalor. 13th July, 1901. (At light).

Tinolius, *Walker*, iii, 621 (1855).

124. Tinolius quadrimaculatus

Tinolius quadrimaculatus, *Walker*, xxxi, 281 (1864).
Tinolius zinga, *Swinhoe*, *Trans. Ent. Soc. London*, 1890, p. 185, pl. 6, fig. 12.

1 ♀. Biserat, Jalor. 11th July, 1901. (At light).

FOCILLIDAE

Boethantha, *Walker*, xxxiii, 982 (1865).
Seneratia, *Moore*, *Lep. Ceylon* iii, p. 202 (1885).

125. Boethantha praecipua

Thermesia praecipua, *Walker*, xxxiii, p. 1056.
Boethantha praecipua, *Swinhoe*, *Cat. Het. Mus. Oxon*, ii, p. 186 (1900).

1 ♂. Sungkei, South Perak. 11th February, 1902. (At light).
1 ♀. Sungkei, South Perak. 11th February, 1902. (At light).

Egnasia, *Walker*, xvi, p. 216 (1858).

126. Egnasia sinuosa

Egnasia sinuosa, *Moore*, *Lep. Atk.*, p. 184 (1882).

1. Biserat, Jalor. 29th June, 1901. (At light).

Zethes, *Ramb.*, *Ann. Soc. Ent. Fr.*, 1833, p. 29.

127. Zethes shivula

Marmorinia shivula, *Guen.*, *Noct.* iii, p. 372 (1852).

1 ♂. Biserat, Jalor. 28th June, 1901. (At light).

128. Zethes loria, nov.

♂. Pinkish grey; palpi, head, and thorax brown pink; abdomen with first segment brown, the others with brown pink bands above, containing pale dots; fore wings with a sub-basal brown pink band, limited on each side by a brown sinuous line, the base itself smeared with white; one black dot in the cell, two at end, linear; in the hind wings the mark is lunular; a thin sinuous grey medial line across both wings; a discal duplex line with a whitish centre, bent inwards on to the costa on the fore wings; a submarginal sinuous line; a black marginal line with black submarginal points; the outer third of both wings suffused with brown pink, and on the fore wing a white lunular subapical patch, edged with brown; on the hind wings a large round black spot near the anal angle. Expanse of wings, 1$\frac{1}{10}$ inches.

Biserat, Jalor. 26th June, 1901. (One example). (At light).

Somewhat resembles *Z. plumipes*, Hampson, but the white subapical mark in that species is excavated and toothed outwards and straight on its inner side.

129. Zethes capatra, nov.

♂. Dull ochreous; palpi with brown bands; head brown; wings irrorated with very minute brown atoms; a very broad brown band from abdominal margin, occupying the basal half of the hind wings, all but the extreme base, extending up the middle of the fore wings to the cell, where it joins a large similarly coloured patch, occupying the apical half, with the exception of the costal and outer margins; a similar coloured patch on the upper half of the outer margin of hind wings; the patches are limited by brown sinuous lines, and there is also a submarginal sinuous line; a black dot at end of cell of fore wings, two on hind wings, and black marginal dots on both wings. Expanse of wings, 1$\frac{4}{10}$ inches.

Sungkei, South Perak. 11th February, 1902. (At light).

Capnodes, *Guen.*, *Noct.* iii, p. 374 (1852).

130. Capnodes finipalpis

Thermesia finipalpis, *Walker*, xv, 1574 (1858).

1 ♀. Biserat, Jalor. 15th July, 1901.

'Resting in open, on upper surface of leaf of shrub; dusk.'

131. **Capnodes badia**, nov.

♀. Of a uniform creamy-grey colour; last joint of palpi white, with a brown band towards its tip; fore wings with the costal line whitish with black spots; a brown lunule at end of cell; antemedial, postmedial, and discal very indistinct, sinuous grey lines, the last the most distinct, with two or three black points; a large, nearly round red spot, formed of red and yellow lines on the lower disc; hind wings slightly suffused with brown, and with indications of two diffuse brown discal bands; both wings with black dots close to the margin, and black dots in the white cilia; abdomen suffused with brown. Expanse of wings, $1\frac{6}{10}$ inches.

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Avitta, *Walker*, xv, 1674 (1858).

132. **Avitta subsignans**

Avitta subsignans, *Walker*, xv, 1675.

1 ♀. Biserat, Jalor. 1st July, 1901. (At light).

DELTOIDIDAE

Simplicia, *Guen.*, *Delt. et. Pyral.*, p. 51 (1854).

133. **Simplicia schaldusalis**

Bocana schaldusalis, *Walker*, xvi, 180 (1858).
Simplicia schaldusalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 197 (1900).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet.

'On upper surface of leaf in jungle; morning.'

Adrapsa, *Walker*, xvi, 169 (1858).

134. **Adrapsa titysusalis**

Bocana titysusalis, *Walker*, xvi, 183.
Adrapsa titysusalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, App., p. 593, pl. 4, fig. 19 (1900).

1 ♂. Sungkei, South Perak. 9th February, 1902. (At light).

Oxaenanus, *Swinboe*, *Cat. Het. Mus. Oxon.* ii, p. 201 (1900).

135. Oxaenanus longipalpis, nov.

♂. Ochreous grey, irrorated with brown atoms ; fore wings with four blackish spots on the costa at equal distances apart, a black dot in the cell and a black lunule at its end, three transverse very sinuous brown lines, antemedial, discal, and submarginal, the last outwardly whitish edged, and marked with black on its upper half, with a blackish spot on the middle of the outer margin ; hind wings with the central space whitish and unmarked, a black lunule at end of cell, a broad black antemedial band, two other lines corresponding to those on fore wings, and a small blackish suffused space near anal angle ; the palpi are of immense length. Expanse of wings, 1 inch. Length of palpi, ¾ inch.

Selangor.

Pseudaglossa, *Grote*, *Bull. Buffalo Soc. Nat. Sci.* ii, p. 47 (1874).

136. Pseudaglossa quadrinctata

Hypogramma quadrinotata, *Walker*, xxxiii, 893 (1865).
Pseudaglossa quadrinotata, *Hampson*, *Moths India* iii, p. 40 (1895).

1 ♀. Biserat, Jalor. 20th October, 1902.

'Flying in small cavern at base of limestone cliff; morning.'

Hydrillodes, *Guen.*, *Delt. et Pyral.*, p. 65 (1854).

137. Hydrillodes lentalis

Hydrillodes lentalis, *Guen.*, *loc. cit.*, p. 66, pl. 5, fig. 3.

1 ♂. Sungkei, South Perak. 9th February, 1902. (At light).

Bortula, *Walker*, xvi, 162 (1858).

138. Bertula abjudicalis

Bertula abjudicalis, *Walker*, xvi, 163.

1 ♂. Bidor, South Perak. 18th January, 1902. (At light).

Echana, *Walker*, xvi, 195 (1858).

139. Echana plicalis

Echana plicalis, *Moore*, *P.Z.S.* 1867, p. 86, pl. 7, fig. 7.

1 ♂. Biserat, Jalor. (At light).

Zanclognatha, *Led.*, *Noct.*, p. 211 (1857).

140. Zanclognatha albapex

Nodaria albapex, *Hampson*, *Moths India* iii, p. 59 (1895).

2 ♂. Sungkei, South Perak. 9th February, 1902.

Progonia, *Hampson*, *Moths India* iv, *App.*, p. 538, (1896).

141. Progonia oileusalis

Herminia oileusalis, *Walker*, xvi, 116, (1858).
Progonia oileusalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 197 (1900).

1 ♀. Biserat, Jalor. 1st July, 1901. (At light).

HYPENIDAE

Talapa, *Moore*, *P.Z.S.* 1867, p. 82.

142. Talapa transvitta

Hingula transvitta, *Moore*, *Lep. Ceylon* iii, p. 551, pl. 215, fig. 1 (1887).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 24th August, 1901.

'Flying in jungle, and settling on ground ; late afternoon.'

Marapana, *Moore*, *Lep. Ceylon* iii, p. 227 (1885).

143. Marapana pulverata

Sanys pulverata, *Guen.*, *Noct.* iii, p. 351, 1822 (1852).

1 ♂. Bidor, South Perak. 20th February, 1902. (At light).

Hypena, *Schrank*, *Faun. Boica* ii (2), p. 163 (1802).

144. Hypena camptogrammalis

Hypena camptogrammalis, *Hampson*, *MS. ined.*

4 ♂. Biserat, Jalor. 15th July, 1901. (At light).
1 ♂. Biserat, Jalor. 2nd July, 1901.

'In sweep-net from sedges ; forenoon.'

Bomolocha, *Hübner*, *Verz. Schmett.*, p. 343 (1818).

145. Bomolocha laesalis

Hypena laesalis, *Walker*, xvi, 62 (1858).

1 ♂. Biserat, Jalor. 29th June and 1st July, 1901. (At light).

Luceria, *Walker*, xix, 853 (1859).

146. Luceria opiliusalis

Luceria opiliusalis, *Walker*, xix, 853.
Luceria opiliusalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 853 (1900).
Rhynchina pallida, *Hampson*, *Ill. Het. B.M.* viii, p. 92, pl. 147, fig. 5 (1891).

1. Biserat, Jalor. 13th July, 1901. (At light).

PSEUDO GEOMETRINA

EPIPLEMIDAE

Epiplema, *Herr.-Schäff. Samml., aussereur. Schmett.* p. 26 (1850).

147. Epiplema conflictaria

Erosia conflictaria, *Walker*, xxiii, 851 (1861).
Epiplema conflictaria, *Swinhoe*, *Trans. Ent. Soc. London*, 1902, p. 594.

2 ♂. Jambu Jhering. 6th and 7th July, 1901.

'Lying flat on leaves, with inner margin of hind wings covering body.'

1 ♂. Biserat, Jalor. 6th July, 1901. (At light).

148. Epiplema clathrata

Epiplema clathrata, *Warren*, *Nov. Zool.* iii, p. 347 (1896).

1. Sungkei, South Perak. 6th February, 1902. (At light).

Dirades, *Walker*, xxxv, 1650 (1866).

149. Dirades conifera

Dirades conifera, *Moore*, *Lep. Ceylon* iii, p. 399, pl. 186, fig. 8 (1887).

2 ♂. Biserat, Jalor. 30th June, 1901, and 1st July, 1901. (At light).

Hitherto only recorded from Ceylon. I have it in my collection from Port Blair, Andaman Islands.

150. Dirades mutans

Erosia mutans, *Butler*, *Ann. Mag. Nat. Hist.* (5) xix, p. 434 (1887).
Dirades mutans, *Swinhoe*, *Trans. Ent. Soc. London*, 1902, p. 597.

2. Biserat, Jalor. 28th June, 1901, and 2nd July, 1901. (At light).
1. ?

Gathynia, *Walker*, xxvi, 1639 (1862).

151. Gathynia miraria

Gathynia miraria, *Walker*, xxvi, 1639.

1. Biserat, Jalor. 30th June, 1901. (At light).

MICRONIIDAE

'The larger representatives of this family show a remarkable resemblance, most probably adaptive, to butterflies of the genus *Cyrestis*, though the latter have yellow markings on their wings, as well as the blackish pencillings characteristic of both ; in both, these pencillings are displayed on pale wings of a peculiarly angular outline and of relatively great extent, and in both there is a tendency towards the development of "tails" to the hind wings, with black "eyes" at their point of origin. Both the moths and the butterflies in this association have the habit of resting on leaves, with the wings spread out flat in the same plane as the body ; but while the butterflies choose the lower surface of the leaves, the Microniidae prefer the upper surface. In this position the moths have a vague and general resemblance to a particularly fluid bird's drooping ; but, judging from the number of occasions on which I have seen their wings lying scattered on the jungle floor, they are very liable to be eaten by birds, reptiles, or small mammals. *Cyrestis periander* (Fabr.) is common among the low undergrowth, which consists largely of a prickly, holly-like shrub, at the base of the limestone cliffs round Biserat and Kampong Jalor, and the Microniidae are often found in the same environment. Some of them are attracted to light at night.'

Strophidia, *Hübner*, *Verz. Schmett.*, p. 290 (1818).

152. Strophidia fasciata

Phalaena-Geometra fasciata, *Cram.*, *Pap. Exot.* ii, p. 12, pl. 104, fig. D (1779).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet. 7th June, 1901. (At light).

Acropteris, *Hübner*, *Geyer*, *Zutrage* iv, p. 38 (1832).

153. Acropteris striataria

Phalaena-Geometra striataria, *Clerck*, *Icones*, pl. 55, fig. 4 (1759).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 30th April, 1901.

'On jungle path ; daytime.'

154. Acropteris ciniferaria

Micronia ciniferaria, *Walker*, xxxv, 1642 (1866).
Acropteris ciniferaria, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 226 (1900).

1 ♂. Biserat, Jalor. 7th July, 1901.

'On leaf in jungle, with wings spread flat.'

155. Acropteris iphiata

Micronia iphiata, *Guen.*, *Phal.* ii, p. 29, 932 (1857).

1 ♂. Mabek, Jalor. 25th July, 1901.

'With wings flat, on leaf in jungle ; mid-day.'

156. Acropteris vagata

Micronia vagata, *Moore*, *P.Z.S.* 1877, p. 622, pl. 60, fig. 18.

1 ♂. Biserat, Jalor. 24th October, 1901.

'Resting, with wings flat, on leaf.

Micronia, *Guen.*, *Phal.* ii, p. 22 (1857).

157. Micronia aculeata

Micronia aculeata, *Guen.*, *loc. cit.*, pl. 13, fig. 8 ♀.

1 ♀. Biserat, Jalor. 1st November, 1901.
1 ♀. Mabek, Jalor. 2nd July, 1901.

'Resting, with wings flat, on leaf ; morning.'

GEOMETRINA

BOARMIIDAE

Xeropteryx, *Butler*, *Journ. Linn. Soc. London*, xvii, p. 203 (1883).

158. Xeropteryx simplicior

Xeropteryx simplicior, *Butler*, *loc. cit.*, p. 204.

1 ♂. (At light).

Ourapteryx, *Leach*, *Zool. Misc.*, p. 79 (1814).

159. Ourapteryx podaliriata

Urapteryx podaliriata, *Guen.*, *Phal.* i, p. 32 (1857).
Ourapteryx podaliriata, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 229 (1900)

1 ♂. Bayu, Jalor. 9th July, 1901.

'Flying, at 9 a.m., in thick plantation, and settling on under surface of leaf.'—H.C.R.

'Both this species and a preceding one resemble the Microniidae in the form and markings of their wings, but the pencillings are somewhat paler, and the size of the moths is considerably greater. Probably they resemble them also in habits.'

Leucetaera, *Warren*, *Nov. Zool.* i, p. 405 (1894).

160. Leucetaera inamata

Acidalia inamata, *Walker*, xxii, 755 (1861).

1 ♀. Biserat, Jalor. 3rd July, 1901.

'Resting on twig of bush in jungle, with wings depressed and abdomen raised in the air.'

Lomographa, *Hübner*, *Verz. Schmett.* p. 311 (1818).

161. Lomographa quadrilineata

Heterostegane quadrilineata, *Warren*, *Nov. Zool.* i, p. 406 (1894).

1. Biserat, Jalor. 2nd July, 1902.

'Resting on wall of house; late afternoon.'

Corymica, *Walker*, xx, 231 (1860).

162. Corymica vitrigera

Corymica vitrigera, *Butler*, *Ill. Het. B.M.* vii, p. 101, pl. 135, fig. 14 (1889).

1 ♂. Bukit Besar, Nawngchik. 2,500 feet.

'Flying in jungle; daytime.'

163. Corymica deducta

Caprilia deducta, *Walker*, xxxv, 1569 (1866).
Corymica caustolomaria, *Moore*, *Lep. Atk.*, p. 231 (1888).
Corymica gensanaria, *Leech*, *Entom. Suppl.*, p. 56 (1896).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 5th September, 1901.

'Resting among long grass; early morning.'

Nearest the form *gensanaria*, with the wings irrorated with chestnut red; but, except as to the shades of colouring, all these forms are identical, and I think *C. arnearia* var. *brunnea*, WARREN, *Nov. Zool.* iii, p. 144 (1896), from the Khasia Hills, belongs to this species; I have in my collection some specimens from the Khasia Hills identical with *deducta*, WALKER, and *caustolomaria*, MOORE, and some more or less irrorated with chestnut red.

Hypochrosis, *Guen.*, *Phal.* ii, p. 536 (1857).

164. Hypochrosis sternaria

Hypochrosis sternaria, *Guen.*, *loc. cit.*, p. 537, 1775.

1 ♂. Bukit Jalor, Jalor; *circa* 300 feet. 29th October, 1901.

'Resting among dead leaves in jungle; closely resembling environment.

165. Hypochrosis lycoraria

Hypochrosis lycoraria, *Guen.*, *Phal.* ii, p. 538, 1778 (1857).

Selangor.

Achrosis, *Guen.*, *Phal.* ii, p. 539 (1857).

166. Achrosis pyrrhularia

Achrosis pyrrhularia, *Guen.*, *loc. cit.*

1 ♂, 1 ♀. Biserat, Jalor. 3rd and 8th July, 1901.

'Resting, with wings spread flat, on leaves of shrubs in jungle.

Hyposidra, *Guen.*, *Phal.* ii, p. 150 (1857).

167. Hyposidra talaca

Lagyra talaca, *Walker*, xx, 59, ♀ (1860).
Chizala deceptatura, *Walker*, xx, 264, ♂.

1 ♀. Biserat, Jalor. 13th July, 1901. (At light).

Hyperythra, *Guen.*, *Phal.* i, p. 99 (1857).

168. Hyperythra lutea

Phalaena-Geometra lutea, *Cram.*, *Pap. Exot.* iv, pl. 370, fig. C, D (1782).

1 ♂. Biserat, Jalor. 20th October, 1901.

'Flying among undergrowth in plantation; sunset.'

1 ♂. Sungkei, South Perak. 11th February, 1902. (At light).

Fascellina, *Walker*, xx, 215 (1860).

169. Fascellina chromataria

Fascellina chromataria, *Walker*, xx, 215, ♀.
Geometra usta, *Walker*, xxxv, 1602, ♂ (1866).

1 ♂. Biserat, Jalor. 12th July, 1901. (At light).

Luxiaria, *Walker*, xx, 231 (1860).

170. Luxaria exclusa

Hemerophila exclusa, *Walker*, xxi, 320 (1860).

1 ♂. Biserat, Jalor. 2nd July, 1901.

'Resting, with wings spread flat, on leaf; late afternoon.'

Gyadroma, *Swinhoe*, *Trans. Ent. Soc. London*, 1894, p. 220.

171. Gyadroma testacearia

Ennomos testacearia, *Moore*, *P.Z.S.* 1867, p. 623.
Gyadroma testacearia, *Swinhoe*, *loc. cit.*

Selangor.

Elphos, *Guen. Phal.* i, p. 285 (1857).

172. Elphos albifascia

Elphos albifascia, *Warren*, *Nov. Zool.* i, p. 430 (1894).

1 ♂. Biserat, Jalor. 3rd July, 1901. (In jungle).

1 ♂. Bukit Besar, Nawngchik. 2,100 feet. 8th May, 1901.

'Flying in jungle; settling on a tree-trunk with wings spread flat, it became practically invisible, despite its large size.'

Ectropis, *Hübner*, *Verz. Schmett.*, p. 299 (1818).

173. Ectropis recticomata, nov.

♂. Uniform dull ochreous grey; shaft of antennae and top of head whitish; antennae bipectinate, branches grey; abdomen with two tufts; forewings with fovea; costa with four brown marks, being the commencement of four transverse, indistinct, greenish-grey bands, sub-basal, antemedial, medial, and discal, at equal distances apart; continuations of the second and fourth only apparent on hind wings ; a submarginal still more indistinct band ; the outer margins grey, crenulate, and with fine brown points on the veins ; underside whitish, with very broad marginal blackish bands, the extreme margin whitish. Expanse of wings, 1 inch.

Bukit Besar, Nawngchik. 2,500 feet. (One example). (At light, in hut).

Boarmia, *Treit., Schmett. Eur.* V. ii, p. 433 (1825).

174. Boarmia trispinaria

Boarmia trispinaria, *Walker*, xxiii, 378 (1860).

1 ♂. Biserat, Jalor. 6th July, 1901.

'On tree-trunk in jungle ; afternoon.'

175. Boarmia lioptilaria, nov.

♂, ♀. Uniform dark grey, with an ochreous tinge, densely irrorated with brown atoms ; shaft of antennae luteous, pectinations for three-fourths length blackish in colour ; a brown ringlet at end of each cell, larger on the hind wings in both sexes ; fore wings crossed by four sinuous, semidentate brown lines, antemedial, medial, postmedial, and submarginal, the second and third inclining towards each other hindwards ; hind wings crossed by three similar lines, two in the middle, rather close together, and the third discal, somewhat near the margin ; black marginal lunules on both wings. Expanse of wings, 1$\frac{8}{10}$ inches.

Selangor ♂ type.
Penang ♀ B.M. collection.

It has a great resemblance to *B. ratotaria*, Swinhoe, from Assam.

ORTHOSTIXIDAE

Eumelea, *Westw. Duncan's Nat. Hist. Libr.* xxxii, *Exot. Moths*, p. 215 (1841).

176. Eumelea rosalia

Phalaena-Geometra rosalia, *Cram., Pap. Exot.* iv, p. 152, pl. 368, fig. F (1782).

4 ♀. Biserat, Jalor. 21st May—26th July, 1901.
1 ♀. Mabek, Jalor. 27th July, 1901.
1 ♂. Telôm, Perak-Pahang Border. 4,000 feet. 24th January, 1902.

'Common among low undergrowth in the jungle, especially at the base of limestone cliffs, near Biserat.'

177. Eumelea aureliata

Eumelea aureliata, *Guen.*, *Phal.* i, p. 394, pl. 22, fig. 6 (1857).

1 ♀. Biserat, Jalor. 8th July, 1901.
1 ♀. Mabek, Jalor.

'The specimens were taken resting under leaves, in low undergrowth, with the abdomen hanging downwards, the ventral surface of the wings being pressed against the lower surface of the leaves. When disturbed on the wing both *E. rosalia* and *E. aureliata* settle and take up this attitude.

Celerena, *Walker*, *Trans. Ent. Soc. London* (3) i, p. 72, (1862).

178. Celerena siamica

Celerena siamica, *Swinhoe*, *Ann. Mag. Nat. Hist. ined.*

2 ♂, 2 ♀.	Biserat, Jalor.		4th and 7th July, 1901.
2 ♀.	Mabek, Jalor.		23rd and 28th July, 1901.
1.	Bukit Besar, Nawngchik.	1,000.	7th September, 1901.

'Common among undergrowth in jungle, especially at Mabek ; flight very strong and sustained, resembling that of many butterflies.'

Rambara, *Moore*, *Lep. Ceylon* iii, p. 458 (1887).

179. Rambara lumenaria

Arrhostia lumenaria, *Hübner*, *Geyer Zutr.* iv, p. 35, fig. 757, 758 (1832).

2 ♀. Biserat, Jalor. 3rd and 7th July, 1901.

'At light, and flying in secondary jungle in the afternoon.'

180. Rambara saponaria

Zanclopteryx saponaria, *Guen.*, *Phal.* ii, p. 16, 915 (1857).

1 ♂. Biserat, Jalor. 5th July, 1901. (At light).

Ozola, *Walker*, xxiv, 1080 (1861).

181. Ozola macariata

Zarmigethusa macariata, *Walker*, xxvi, 1637 (1862).
Ozola macariata, *Swinhoe*, *Trans. Ent. Soc. London*, 1902, p. 645.

1 ♂. Biserat, Jalor. 14th July, 1901. (At light).

LARENTIIDAE

Collix, *Guen.*, *Phal.* ii, p. 357 (1857).

182. Collix icteraria, nov.

♀ Brown, with a pinkish tinge ; abdomen, with whitish segmental lines ; transverse lines on forewings white, edged with black and brown, outwardly curved ; first sub-basal, second and third close together, one-third from base ; fourth discal ; a black patch or suffusion inside it, towards costa ; a similar patch outside the third line ; a sub-apical patch, and one a little above the middle near outer margin ; many whitish semidentate transverse lines very indistinct, and the whole of the hind wings covered with similar lines a little more distinct ; marginal line and cilia ochreous ; underside whitish, markings very prominent ; a black spot at end of each cell, a black dentated band across middle of both wings, some paler grey bands on the inner portions, and a broad discal band ; no longitudinal streaks. Expanse of wings, $1\frac{1}{10}$ inches.

Selangor.

STERRHIDAE

Craspedia, *Hübner*, *Verz. Schmett.*, p. 312 (1818).

183. Craspedia nesciaria

Acidalia nesciaria, *Walker*, xxii, 750 (1861).

1 ♂.	Sungkei, South Perak.	11th February, 1902.	(At light).
1 ♀.	Biserat, Jalor.	15th July, 1901.	(At light).
	Selangor.	May, 1902.	

184. Craspedia aspilataria

Acidalia aspilataria, *Walker*, xxiii, 791 (1861).
Acidlia aspilataria, *Hampson*, *Moths India* iii, p. 432 (1895).

Selangor.

Lycauges, *Butler*, *Ann. Mag. Nat. Hist.* (5) iv, p. 373 (1879).

185. Lycauges anaitisaria

Acidalia (?) anaitisaria, *Walker*, xxiii, 795 (1861).

1 ♀. Mabek, Jalor. 23rd July, 1901.

'Resting on leaf in jungle ; mid-day.'

Chrysocraspeda, *Hampson*, *Moths Ind.* iii, p. 443 (1895).

186. Chrysocraspeda rubricata, nov.

♂. The ground colour pale primrose, nearly the entire surface of the fore wings streaked and irrorated with rufous, leaving a primrose small space near the base and a larger one outside the upper end of the cell; a brown short line at the end of the cell, and indications on the hind margin of interior, central, and discal transverse lines; the hind wings are pale primrose coloured, with thin rufous bands and some basal rufous marks; an ante-medial straight band, a discal duplex, outwardly curved band, with a streak curving down between them from the costa, where they join; both wings angled in the middle, and with rufous marginal thin bands. Expanse of wings, 1 inch.

Bukit Besar, Nawngchik. 2,000 feet.

'On dead banana leaves in stream; morning.'

Somatina, *Guen.*, *Phal.* ii, p. 10, (1857).

187. Somatina anthophilata

Somatina anthophilata, *Guen.*, *loc. cit.*, p. 11, pl. 18, fig. 2.

1 ♀.

'Resting on leaf; early morning.'

Nobilia, *Walker*, xxiv, 1098 (1862).

188. Nobilia turbata

Nobilia turbata, *Walker*, xxiv, 1098.

1 ♂. Sungkei, South Perak. 10th February, 1902. (At light).

GEOMETRIDAE

Dysphania, *Hübner*, *Verz. Schmett.*, p. 175 (1818).

189. Dysphania militaris

Phalaena militaris, *Linn.*, *Mus. Lud. Ulr.*, p. 375 (1764).
Dysphania militaris, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 379 (1900).
Euschema abrupta, *Walker*, *Trans. Ent. Soc. London*, 1859, p. 70.

2 ♂. Jor, South Perak. *Circa* 2,000 feet. 16th January, 1902.

190. Dysphania malayaria

Hazis malayaria, *Guen.*, *Uran. et Phal.* ii, p. 189 (1857).

1 ♂. Mata Rusa, near Biserat, Jalor. 7th August, 1901.

'In undergrowth ; early morning.'

191. Dysphania aurilimbata

Euschema aurilimbata, *Moore*, *P.Z.S.* 1878, p. 846.
Dysphania supergressa, *Warren*, *Nov. Zool.* ii, p. 87 (1895).

1 ♀. Bukit Jalor, Jalor. 28th June, 1901.

'On wing in bright sunshine ; early afternoon.'

192. Dysphania subrepleta

Euschema subrepleta, *Walker*, ii, 406 (1854).
Hazis bellonaria, *Guen.*, *Phal.* ii, p. 193, pl. 18, fig. 1 (1857).
Euschema sodalis, *Moore*, *Journ. As. Soc. Beng.* lv. (2), p. 99 (1886).

2 ♂. Jor, South Perak. *Circa* 2,000 feet. 16th January, 1902.

'These specimens were taken, together with those representing *D. militaris*, in the early morning, resting on a rock in the stream and evidently half paralysed with cold.'

Pseudoterpna, *Hübner*, *Verz. Schmett.*, p. 248 (1818).

193. Pseudoterpna chlora

Phalaena chlora, *Cram.*, *Pap. Exot.* iv, p. 233, pl. 398, fig. C (1782).

1 ♂. Jeram Kawan, South Perak. 15th February, 1902.

Ornithospila, *Warren*, *Nov. Zool.* i, p. 386 (1894).

194. Ornithospila avicularia

Geometra avicularia, *Guen.*, *Phal.* i, p. 342, 526 (1857).

2 ♀. Biserat, Jalor. 2nd to 4th July, 1901.

'Flying in jungle after rain ; afternoon.'

THYRIDIDAE

Striglina, *Guen.*, *Ann. Soc. Ent. Fr.* (5) vii, p. 283 (1877).

195. Striglina decussata

Sonagara decussata, *Moore*, *P.Z.S.* 1883, p. 27, pl. 6, fig. 8.

1 ♂. Sungkei, South Perak. 10th February, 1902. (At light).
Selangor.

Rhodoneura, *Guen.*, *Sp. Gen. Lep. Phal.* ii, pl. 1, fig. 8, (1857).

196. Rhodoneura marmorealis

Rhodoneura marmorealis, *Moore*, *P.Z.S.* 1877, p. 617.

1 ♂. Biserat, Jalor. 4th July, 1901. (In jungle).

197. Rhodoneura capotona, nov.

♂. Ground colour ochreous grey, striated, and marked with chestnut brown; a band behind the head; fore wings with whitish patches on the costa, and many transverse pale chestnut bands; both wings with a broad dark-brown band from abdominal margin above the anal angle to near the costa of forewings, one-third from apex; this band is nearly straight, and fairly uniform in breadth, except that in nearing the costa it terminates in a large round patch; the underside is whitish, tinged with ochreous, with the markings more patchy and less developed; abdomen long, double the breadth of hind wings; anal tufts large. Expanse of wings, $1\frac{7}{10}$ inches.

Selangor.

Resembles *R. reticulata*, Moore, in shape of wings.

Addaea, *Walker*, xxxiv, 1201 (1865).

188. Addaea trimeronalis

Pyralis (?) trimeronalis, *Walker*, xix, 916 (1859).
Addaea trimeronalis, *Hampson*, *P.Z.S.* 1897, p. 632 (fig.)

1. Mabek, Jalor. 23rd July, 1901.

'Resting on leaf in jungle; mid-day.'

CRAMBIDAE

Chilo, *Zinck.*, *Germar's Mag. Ent.* ii, p. 33 (1817).

199. Chilo simplex

Jartheza simplex, *Butler*, *P.Z.S.* 1880, p. 690.

2.	Patani.	19th June, 1901.
1.	Biserat, Jalor.	10th July, 1901.
1.	Bidor, South Perak.	2nd February, 1902.
2.	Sungkei, South Perak.	11th February, 1902.

(All at light).

200. Chilo suppressalis

Crambus suppressalis, *Walker*, xxvii, 166 (1863).
Chilo suppressalis, *Hampson*, *P.Z.S.* 1895, p. 957.

1. Patani. 9th October, 1901.
3. Biserat, Jalor. 7th and 13th July, 1901.
(All at light).

Crambus, *Fabr.*, *Ent. Syst. Suppl.*, p. 464 (1798).

201. Crambus tonsalis

Myeza tonsalis, *Walker*, xxvii, 190 (1863).
Crambus tonsalis, *Hampson*, *P.Z.S.* 1895, p. 926.

1 ♂. Bidor, South Perak. 21st February, 1902. (At light).

Ancylolomia, *Hübner*, *Verz. Schmett.*, p. 363 (1818).

202. Ancylolomia chrysographella

Chilo chrysographellus, *Kollar*, *Hüg. Kasch.* iv, p. 494 (1844).

2. Biserat, Jalor. 1st and 13th July, 1901. (At light).

SCHOENOBIIDAE

Scirpophaga, *Treit.*, *Schmett. Eur.* ix, i, p. 55 (1832).

203. Scirpophaga auriflua

Scirpophaga auriflua, *Zeller*, *Mon. Chil. et Cramb.*, p. 2 (1863).

7. Biserat, Jalor. 15th and 20th October, 1901, and 18th July, 1901.
2. Sungkei, South Perak. 6th February, 1902.
(All at light).

Schoenobius, *Dup.*, *Cat. Lep. Eur.*, p. 312 (1844).

204. Schoenobius bipunctifera

Tipanaea bipunctifera, *Walker*, xxviii, 523 (1863).

1. Sungkei, South Perak. 7th February, 1902.
1. Biserat, Jalor. 6th July, 1901.
(Both at light).

205. Schoenobius dodatellus

Chilo dodatellus, *Walker*, xxx, 966 (1864).

Schoenobius dodatellus, *Hampson*, *Moths India* iv, p. 48 (1896).

1 ♂, 3 ♀. Biserat, Jalor. 13th July, 1901, and 9th August, 1901.
1 ♂. Sungkei, South Perak. 6th February, 1902.
1 ♀. Bidor, South Perak. 22nd February, 1902.
(All at light).

206. Schoenobius immeritalis

Dosara immeritalis, *Walker*, xix, 830 (1859).

Schoenobius immeritalis, *Hampson*, *P.Z.S.* 1895, p. 915.

1. Biserat, Jalor. 11th July, 1901. (At light).

ANERASTIIDAE

Polyocha, *Zeller*, *Isis*, 1848, p. 876.

207. Polyocha anerastica

Nephopteryx anerastica, *Snellen*, *Bijdr. Faun. Midd. Sumatr.* 1880, p. 81.

Emmalocera anerastica, *Rag. Mem. sur Lep.* viii, p. 317, pl. 36, f. 8 (1901).

Selangor.

GALLERIIDAE

Prasinoxena, *Meyrick*, *Trans. Ent. Soc. London*, 1894, p. 479.

208. Prasinoxena viridissima, nov.

Head, thorax, and fore wings dark brilliant green ; five large yellowish spots, occupying the whole of the outer margin, all with rounded inner sides ; the first three from the apex do not quite touch each other, the last two are conjoined ; hind wings and abdomen pure white ; underside, wings as above, the green of fore wings paler, body and legs bright green, tarsi white. Expanse of wings, ½ inch.

Selangor.

Somewhat resembling *P. monospila*, Meyrick, from Borneo, but the apex of the fore wings much more acute, almost falcate, and the outer margin somewhat concave.

PHYCITIDAE

Canthelia, *Walker*, xxxv, 1726 (1866).

209. Canthelia lateritalis

Eurhodope lateritalis, *Walker*, xxvii, 74 (1863).

1. Biserat, Jalor. 10th July, 1901.
1. Patani. 8th October, 1901.
(Both at light).

Rhodophaea, *Guen., Eur. Microlep. Ins. Meth.*, p. 74 (1845).

210. Rhodophaea heringi

Rhodophaea heringi, *Rag., Ann. Soc. Ent. Fr.*, 1888, p. 282.
Rhodophaea heringi, *Rag., Mon. Phyc.*, p. 73, pl. 8, fig. 1 (1893).

1. Biserat, Jalor. 12th July, 1901. (At light).

Oligochroa, *Rag., Nouv. Gen.*, p. 20 (1888).

211. Oligochroa mundalis

Nephopteryx mundalis, *Walker*, xxvii, 67 (1863).
Oligochroa mundalis, *Rag. Mem. sur Lep.* vii, p. 387, pl. 12, fig. 11 (1893).

Selangor.

PYRALIDAE

Pyralis, *Linn, Syst. Nat.* xii, p. 881 (1767).

212. Pyralis fumipennis

Pyralis fumipennis, *Butler, Ill. Het. B.M.* vii, p. 91, pl. 134, fig. 11 (1889).

12. Goah Tanah (Earth Cave), Bukit Tapang, nr. Biserat, Jalor. 9th July, 1901.
1. Goah Tanah (Earth Cave), Bukit Tapang, nr. Biserat, Jalor. 16th October, 1901.

'We found numbers of this moth seated on the walls of one of the big limestone caves near Biserat, and did not see it elsewhere. It was only observed in that part of the cave that was absolutely dark, and, so far as we could judge, did not penetrate into the extremity, which was partially lighted by holes in the roof. It was not attracted to the light of our torches and lanterns. Very possibly the species only shelters in the cave during the day, for it is almost inconceivable that it should be truly cavernicolous, in the sense of being a regular denizen, being born, breeding, and dying in the cave without ever coming to the exterior.'

ENDOTRICHIDAE

Cotachena, *Moore, Lep. Ceylon* iii, p. 275 (1885).

213. Cotachena histricalis

Botys histricalis, *Walker*, xviii, 655 (1859).

2. Jeram Kawan, South Perak. 13th February, 1902. (At light).

NYMPHULIDAE

Nymphula, *Schrank*, *Faun. Boic.* ii (2), p. 162 (1802).

214. Nymphula affinialis

Paraponyx affinialis, *Guen.*, *Delt. et Pyral.*, p. 259, 270 (1854).

2. Biserat, Jalor. 11th and 13th July, 1901. (At light).

Stenia, *Guen.*, *Dup. Cat. Méth.*, p. 201 (1844).

215. Stenia spodinopa

Symmoracma spodinopa, *Meyrick*, *Trans. Ent. Soc. London*, 1894, p. 469.
Stenia spodinopa, *Hampson*, *Trans. Ent. Soc. London*, 1897, p. 207.

1. Biserat, Jalor. 1st July, 1901. (At light).

Erilita, *Led.*, *Wien. Ent. Mon.* vii, p. 426 (1863).

216. Erilita admixtalis

Botys admixtalis, *Walker*, xviii, 665 (1859).

1. Sungkei, South Perak. 6th February, 1902. (At light).

PYRAUSTIDAE

Aripana, *Moore*, *Lep. Ceylon* iii, p. 312 (1886).

217. Aripana caberalis

Spilomela caberalis, *Guen.*, *Delt. et Pyral*, p. 284, 282 (1854).

1. Biserat, Jalor. 29th June, 1901. (At light).

Syngamia, *Guen. Delt. et Pyral*, p. 187 (1854).

218. Syngamia xanthalis

Syngamia xanthalis, *Hampson*, *P.Z.S.* 1898, p. 644.

1. Jeram Kawan, South Perak. 13th February, 1902. (At light).

219. Syngamia floridalis

Stenia floridalis, *Zeller*, *K. Vet-Ak. Handl.*, 1852, p. 6.

2. Biserat, Jalor. 13th and 16th July, 1901.

'One at light; one flying very low over bare ground in open at mid-day.'

Rhimphaleodes, *Hampson*, *Ill. Het.* ix, p. 174 (1893).

220. Rhimphaleodes macrostigma

Rhimphaleodes macrostigma, *Hampson*, *loc. cit.*, pl. 174, fig. 9.

1. Biserat, Jalor. 28th June, 1901. (At light).

Epimima, *Meyrick*, *Trans. Ent. Soc. London*, 1886, p. 235.

221. Epimima bilinealis

Dolichosticha bilinealis, *Hampson*, *Ill. Het. B.M.* viii, p. 139, pl. 155, fig. 25 (1891).

Marasmia bilinealis, *Hampson*, *Moths India* iv, p. 277 (1896).

1. Biserat, Jalor. 13th July, 1901.

Ravanoa, *Moore*, *Lep. Ceylon* iii, p. 284 (1885).

222. Ravanca xiphialis

Zebronia xiphialis, *Walker*, xvii, 483 (1859).

1. Biserat, Jalor. 24th October, 1901. (At light).

Eurrhyparodes, *Snellen*, *Tijd. v. Ent.* xxiii, p. 215 (1880).

223. Eurrhyparodes bracteolalis

Botys bracteolalis, *Zeller*, *Caffr.*, p. 30 (1852).

1. Biserat, Jalor. 20th October, 1901. (At light).

Agrotera, *Schrank*, *Faun. Boica* ii, p. 163 (1798).

224. Agrotera coelatalis

Nistra coelatalis, *Walker*, xvii, 488 (1859).

1. Biserat, Jalor. 29th June, 1901.
1. Sungkei, South Perak. 11th February, 1902.
(Both at light).

225. Agrotera effertalis

Aediodes effertalis, *Walker*, xvii, 348 (1859).

Agrotera effertalis, *Hampson*, *Ill. Het. B.M.* ix, p. 173, pl. 174, fig. 19 (1893).

Selangor.

Bocchoris, *Moore*, *Lep. Ceylon* iii, p. 271 (1885).

226. Bocchoris onychinalis

Asopia onychinalis, *Guen.*, *Delt. et Pyral*, p. 158, 205 (1854).

3. Jor, Perak-Pahang border. *Circa* 2,000 feet. 27th January, 1902. (At light).

Platamonia, *Led.*, *Wien. Ent. Mon.* vii, p. 427 (1863).

227. Platamonia camillusalis

Botys camillusalis, *Walker*, xviii, 713 (1859).

1. ?

'Flying in jungle ; late afternoon.'

Pinacia, *Hübner*, *Zutrage* iv, p. 15 (1832).

228. Pinacia fulvidorsalis

Pinacia fulvidorsalis, *Hübner*, *loc. cit.*, figs. 643, 644.

2. Biserat, Jalor. 1st July, 1901. (At light).

Tyspanodes, *Warren*, *Ann. Mag. Nat. Hist.* (6) vii, p. 425 (1891).

229. Tyspanodes exathesalis

Euglyphis exathesalis, *Walker*, xix, 978 (1859).
Tyspanodes exathesalis, *Swinhoe*, *Cat. Het. Mus. Oxon* ii, p. 474, pl. 6, fig. 16 (1900).

Selangor.

Saroscelis, *Meyrick*, *Trans. Ent. Soc. London*, 1894, p. 461.

230. Saroscelis nicoalis

Botys nicoalis, *Walker*, xviii, 700 (1859).
Saroscelis nicoalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 475, pl. 8, fig. 3 (1900).

1. Jeram Kawan, South Perak. 13th January, 1902. (At light).

Dichocrocis, *Led.*, *Wien. Ent. Mon.*, 1863, p. 447.

231. Dichocrocis bilinealis

Dichocrocis bilinealis, *Hampson*, *Moths India* iv, p. 306 (1896).

1. Patani. 9th October, 1901. (At light).

232. Dichocrocis punctiferalis

Astura punctiferalis, *Guen.*, *Delt. et Pyral.*, p. 320, 347 (1854).
Dichocrocis punctiferalis, *Hampson*, *P.Z.S.* 1898, p. 690.

Selangor.

233. Dichocrocis megillalis

Botys megillalis, *Walker*, xviii, 700 (1859).
Dichocrocis megillalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 483, pl. 8, fig. 2 (1900).

Selangor.

Merotoma, *Meyrick*, *Trans. Ent. Soc. London*, 1894, p. 460.

234. Merotoma dairalis

Botys dairalis, *Walker*, xviii, 698 (1859).

1. Sungkei, South Perak. 8th February, 1902.
1. Bidor, South Perak. 20th February, 1902.

'Both at light.'

Goniorhynchus, *Hampson*, *Moths India* iv, p. 322 (1896).

235. Goniorhynchus gratalis

Botys gratalis, *Led.*, *Wien. Ent. Mon.* vii, p. 475, pl. 11, fig. 18 (1863).

1. Biserat, Jalor. 20th October, 1901. (At light).

Endographis, *Meyrick*, *Trans. Ent. Soc. London*, 1894, p. 464.

236. Endographis acrochlora

Endographis acrochlora, *Meyrick*, *loc. cit.*, p. 465.

Selangor.

Endocrossis, *Meyrick*, *Trans. Ent. Soc. London*, 1889, p. 515.

237. Endocrossis flavibasalis

Botyodes flavibasalis, *Moore*, *P.Z.S.* 1867, p. 96. ♀

1. Mabek, Jalor. 24th July, 1901.

'At light, in hut.'

Pramadea, *Moore*, *Lep. Atk.*, p. 211 (1888).

238. Pramadea lunalis

Botys lunalis, *Guen.*, *Delt. et Pyral.*, p. 352, 417 (1854).

1. Biserat, Jalor. 11th July, 1901.
1. Sungkei, South Perak. 11th February, 1902.

'Both at light.'

239. Pramadea luctuosalis

Hyalitis luctuosalis, *Guen.*, *Delt. et Pyral.*, p. 290, 291 (1854).

1. Sungkei. South Perak. 6th February, 1902. (At light)

Sylepta, *Hübner*, *Verz. Schmett.*, p. 356 (1818).

240. Sylepta ogoalis

Botys ogoalis, *Walker*, xviii, 689 (1859).
Coptobasis colomboensis, *Moore*, *Lep. Ceylon* iii, p. 556, pl. 215, fig. 13 (1887).

1. Biserat, Jalor. 28th June, 1901.
1. Jor, Perak-Pahang border. 2,000 feet. 27th January, 1902.

'Both at light, in house.'

Lygropia, *Led.*, *Wien. Ent. Mon.* vii, 381 (1863).

241. Lygropia amyntusalis

Botys amyntusalis, *Walker*, xviii, 662 (1859).
Lygropia amyntusalis, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 497 (1900).

3. Biserat. Jalor. 1st to 14th July, 1901. (At light).

Agathodes, *Guen.*, *Delt. et Pyral.*, p. 207 (1854).

242. Agathodes ostentalis

Perinephela ostentalis, *Hübner*, *Geyer*, *Zutr.* v, p. 11, fig. 833, 834 (1838).

1. Sungkei, South Perak. 8th February, 1902. (At light).

Sisyrophora, *Led.*, *Wien. Ent. Mon.* vii, p. 399.

243. Sisyrophora pfeifferae

Sisyrophora pfeifferae, *Led.*, *loc. cit.*, pl. 13, fig. 13.

2. Jor, Perak-Pahang border. *Circa* 2,000 feet. 27th January, 1902. (At light),

Arthroschista, *Swinhoe*, *Cat. Het. Mus. Oxon.* ii, p. 500 (1900).

244. Arthroschista hilaralis

Margaronia hilaralis, *Walker*, xviii, 532 (1859).

1. Jeram Kawan, South Perak. 13th February, 1902. (At light).

Margaronia, *Hübner*, *Verz. Schmett.*, p. 358 (1818).

245. Margaronia itysalis

Glyphodes itysalis, *Walker*, xvii, 501 (1859).

1. Biserat, Jalor. 15th October, 1901.

246. Margaronia actorionalis

Glyphodes actorionalis, *Walker*, xvii, 498 (1859).

1. Jeram Kawan, South Perak. 25th February, 1902. (At light).

247. Margaronia parvalis

Glyphodes parvalis, *Walker*, xxxiv, 1355 (1866).

1. Biserat Jalor. 29th June, 1902. (At light).
1. ?

248. Margaronia eburnealis, nov.

♀. Palpi, frons, shoulders, and band behind the head dark chocolate brown ; palpi beneath, wings, body, and legs shining white ; tip of abdomen and two broad bands on fore legs chocolate brown ; a median band of that colour along costa of fore wings above, and on outer margin of both wings above and below, the band slightly broader on the outer margin than on the costa of the fore wings ; fore wings with a brown spot in the middle of the cell and another at its upper end, both touching the costal band, the white of the wings running as a small wedge into the chocolate-brown colour at the apex. Expanse of wings, 1$\frac{2}{10}$ inches.

Bukit Besar, Nawngchik. 2,500 feet. One example.

'Flying among long grass, after rain ; afternoon.'

Something like *M. elealis*, WALKER, from Africa, but that species has much broader marginal bands, and the white does not run into the apex of fore wings.

249. Margaronia canthusalis

Glyphodes canthusalis, *Walker*, xvii, 505 (1859).
Botys luciferalis, *Walker*, xxxiv, 1,412 (1865).
Glyphodes spectandalis, *Snellen*, *Tijd. v. Ent.* xxxviii, p. 138, pl. 6, fig. 1 (1895).

Selangor.

Polythlipta, *Led.*, *Wien. Ent. Mon.* vii, p. 389 (1863).

250. Polythlipta euroalis

Nausinoe euroalis, *Swinhoe*, *P.Z.S.* 1889, p. 420, pl. 44, fig. 12.

1. Biserat, Jalor. 29th January, 1901. (At light).

Sameodes, *Snellen*, *Tijd. v. Ent.* xxiii, p. 217 (1880).

251. Sameodes cancellalis

Botys cancellalis, *Zeller*, *Caffr.*, p. 34 (1852).

2. Biserat, Jalor. 9th and 16th July, 1901.

'One at light ; one in jungle in the morning.'

Prophantis, *Warren*, *Ann. Mag. Nat. Hist.* (6) viii, p. 113 (1896).

252. Prophantis octoguttalis

Botys octoguttalis, *Felder*, *Reise Nov. Lep.*, pl. 135, fig. 38 (1874).

1. Mabek, Jalor. 29th July, 1901.

'Nat. coll. in jungle.'

Crochiphora, *Hübner*, *Geyer*, *Samml. Exot. Scbmett.* iv, p. 12 (1838).

253. Orochiphcra testulalis

Crochiphora testulalis, *Hübner*, *loc. cit.*, figs. 629, 630.

1. Sungkei, South Perak. 10th February, 1902. (At light).

254. Orochiphora amboinalis

Siriocauta (?) amboinalis, *Felder*, *Reise Nov. Lep.*, pl. 135, fig. 24 (1874).

1. Biserat, Jalor. 23rd October, 1901. (At light).
Selangor.

Pachyzancia, *Meyrick*, *Trans. Ent. Soc. London*, 1884, p. 315.

255. Pachyzancia mutualis

Botys mutualis, *Zeller*, *Caffr.*, p. 40, (1852).

1. Biserat, Jalor. 11th July, 1901. (At light).

Acharana, *Moore*, *Lep. Ceylon* iii, p. 285 (1885).

256. Acharana phaeopteralis

Botys phaeopteralis, *Guen.*, *Delt. et Pyral.*, p. 349, 409 (1854).

4. Biserat, Jalor. 1st to 15th July, 1901. (At light).

257. Acharana licarsisalis

Botys licarsisalis, *Walker*, xviii, 686 (1859).

1. Biserat, Jalor. 11th July, 1901. (At light).

Pionea, *Guen.*, *Delt. et Pyral.*, p. 367 (1854).

258. Pionea flavofimbriata

Mabra flavofimbriata, *Moore*, *Lep. Atk.*, p. 208 (1888).
Pionea flavofimbriata, *Swinhoe* (note), *Ann. Mag. Nat. Hist.* (7) viii, p. 138 (1901).

1. Biserat, Jalor. 23rd October, 1901. (At light).

Pyrausta, *Schrank*, *Faun. Boica* ii (2), p. 163 (1802).

259. Pyrausta ciniferalis

Pyrausta ciniferalis, *Walker*, xxxiv, 1417 (1865).
Hapalia concolor, *Moore*, *Lep. Ceylon* iii, p. 339, pl. 181, fig. 3 (1886).

1. Mabek, Jalor. 23rd July, 1901. (At light).

TINEIDAE

Coryptilum, *Zeller*, *Isis.*, p. 181 (1839).

260. Coryptilum klugi

Coryptilum klugi, *Zeller*, *loc. cit.*; *Walsingham*, *Swinhoe's Cat. Het. Mus. Oxon.* ii, p. 580 (1900).

1. Bukit Besar, Nawngchik. 2,500 feet. 2nd May, 1901.

'Flying round inflorescence of wild banana; late afternoon.'

2. Jeram Kawan, South Perak. 13th February, 1902.

'Fairly abundant among undergrowth, especially where there are wild bananas and gingerworts.'

Monopis, *Hübner, Verz. Schmett.*, p. 401 (1826).
Blabophanes, *Zeller, Linn. Ent.* vi, p. 100 (1852).

261. Monopis monachella

Tinea monachella, *Hübner, Samml. Eur. Schmett.* viii, pl. 21, fig. 143 (1860).
Monopis monachella, *Walsingham, Trans. Ent. Soc. London*, 1897, p. 63.

1. Patani. 8th October, 1901. (At light).

SUPPLEMENTARY LIST OF SPHINGIDAE

By Dr. K. JORDAN, Ph.D.

[Before Colonel Swinhoe undertook to describe out Heterocera, the majority of the Sphingidae had been submitted to Dr. K. Jordan, who has enumerated the following species] :—

ACHERONTIINAE

Acherontia, *Laspeyres, Jenaische Allg. Lit. Zeit.* iv, p. 99 (1809).

262. Acherontia lachesis

Sphinx lachesis, *Fabr. Ent. Syst. Suppl.*, p. 434, n. 26-7 (1798).

1 ♀. Bukit Besar, Nawngchik. 2,500 feet. 2nd May, 1901. (At light).

263. Acherontia styx, subsp. **crathis**

Acherontia styx crathis, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 23 (1903) (Japan to Ceram and Kisser).

1 ♀. Ban Sai Kau, Nawngchik. April, 1901.

'Both this and the preceding species squeak when disturbed or handled.'

Meganoton, *Boisd. Spéc. Gén. Lép. Hét.* i, p. 58 (1875).

264. Meganoton nyctiphanes

Macrosila nyctiphanes, *Walker*, viii, 209 (1856).
Meganoton nyctiphanes, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 35 (1903).

♂, ♀. Biserat, Jalor. 10th July, 1901.

'On tree-trunk in village ; sunset.'

SESIINAE

Cephonodes, *Hübner, Verz. Schmett.*, p. 131 (1822).

265. Cephonodes hylas, subsp. **hylas.**

Sphinx hylas, *Linn. Mant. Plant.*, p. 539 (1771).
Cephonodes hylas hylas, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 468 (1903).

1 ♀. Mabek, Jalor. 29th July, 1901.

'In the State of Selangor the larva of this species has become a serious agricultural pest, and has utterly destroyed several plantations of Liberian coffee.'

PHILAMPELINAE

Panacra, *Walker*, viii, 154 (1856).

266. Panacra variolosa

Panacra variolosa, *Walker*, viii, 156 (1856).
Panacra variolosa, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 539 (1903).

♂. Bukit Besar, Nawngchik. 2,500 feet. May, 1901.

267. Panacra myodon, subsp. **elegantulus**

Thyreus elegantulus, *Herr.-Schäff. Ausseur. Schmett.*, f. 479 (1856).
Panacra myodon elegantulus, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 542 (1903).

♀. Semangko Pass, Selangor-Pahang border. 2,700 feet. May, 1902. (At light).

CHOEROCAMPINAE

Macroglossum, *Scop. Intr. Hist. Nat.*, p. 414 (1777).

268. Macroglossum insipida, subsp. **insipida**

Macroglossa insipida, *Butler*, *P.Z.S.* p. 242 (1875).
Macroglossum insipida insipida, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 642 (1903).

1 ♀. Biserat, Jalor. 16th July, 1901.

'Common at Biserat, flying rapidly among low shrubs at dusk.'

Theretra, *Hübner*, *Verz. Schmett.*, p. 135 (1822).

269. Theretra pinastrina, subsp. **pinastrina**

Sphinx pinastrina, *Martyn*, *Psyche*, t. 29, p. 81 (1797).
Theretra pinastrina pinastrina, *Roths. & Jord. Nov. Zool.* ix, Suppl. p. 784 (1903).

1 ♂. Sungkei, South Perak. 10th February, 1902. (At light).
1 ♀. Kuala Lumpur, Selangor. 10th June, 1902.

LAND PLANARIANS

BY

F. F. LAIDLAW, B.A.

INTRODUCTORY NOTE

ONLY three examples of this group were preserved by us, and we did not see many more. Indeed, as I have noticed on both my visits to the Patani States, Land Planarians are very scarce in this district in dry weather, and by no means common even during the stormy season, whereas in the interior of Kelantan they are comparatively abundant in a moderately moist environment, such as exists in August and September at Kuala Aring. There is no reason to think that the species are less numerous in the southern half of the Malay Peninsula than they are in Java or Ceylon, but they have been very little collected.

NELSON ANNANDALE

REPORT ON THE LAND PLANARIANS

By F. F. LAIDLAW, B.A.
DEMONSTRATOR AND LECTURER IN THE OWENS COLLEGE, MANCHESTER.

BIPALIIDAE

1. Bipalium jalorense, sp. nov.

One specimen, from the interior of a rotten tree-trunk lying on the ground.

Bukit Besar, borders of Jalor and Nawngchik. 2,500 feet.

Very distinct from any species hitherto recorded from the Peninsula. Unfortunately the only specimen has lost its hinder end, but the characters are sufficiently well marked to admit of a satisfactory diagnosis.

The length of the fragment is about 30 mm., the breadth 5 mm. The breadth of the head is about 8 mm., and that of the 'sole' 1 mm. The margin of the body is bright yellow. The middle of the dorsal surface is occupied by a longitudinal dark band about 3·5 mm. in breadth, which is nearly black laterally, but becomes slightly paler towards the middle line. The under surface has the margin yellow (the whole side of the body being of this colour). This margin is about as deep as on the dorsal surface. Within the margin on either side is a black band about 1 mm. in width, fading on its inner side to yellowish-white. The sole is white.

The margin of the head and its lobes are yellow, thickly studded, especially towards the middle line, with minute eye-spots. The margin is about 1 mm. in breadth, and is succeeded by a well-defined, thick crescentic line of about the same breadth as itself, which commences on the under surface of the body, just behind the angles of the lobes, and is in turn followed by a small semi-circular patch of yellow, which intervenes between the crescentic black line of the head and the median black band of the body.

The eye-spots on the margin of the head are so numerous as to give it a brownish tinge. Those lying along the extreme edge of the margin are decidedly smaller than those lying further back. Eye-spots occur also on the ventral side of the black marks in the angles of the lobes.

RHYNCHODEMIDAE

2. Rhynchodemus nematoides, Loman

Two specimens from the same locality. A common and widely-spread species ; it has also been recorded from Java and Ceylon.

'One of these specimens was taken on a banana leaf growing at the edge of a small jungle clearing ; the other was gliding on the shady side of a tree-trunk in thick jungle. The latter individual moved up to a colony of *Psocidae* (Neuroptera) that, as a whole, closely resembled a foliaceous lichen, wound its body partially round one of the insects, protruded its pharynx over the body of its victim (which, apparently, made no attempt to escape), and commenced to devour it.

'*Rhynchodemus nematoides*, or a species resembling it in its comparatively sober grey coloration and slender shape, became more abundant than any other at Kampong Jalor during the rains in November, gliding in the early morning on the leaves of bushes surrounding the village ; I probably observed about half-a-dozen specimens in the course of a fortnight.'

The following is a list of species known to occur in the Malay Peninsula :—

Pelmatoplana sondaiaca (LOMAN).	Singapore ; Kuala Aring, [Kelantan.
Bipalium steindachneri, v. GR.	Malacca.
" *strubelli*, v. GR.	Singapore.
" *rauchi*, v. GR.	"
" *ridleyi*, v. GR.	"
" *phoebe* (?) var. *transversifasciatum*,[1] MÜLLER.	Kuala Aring, Kelantan.
" *megacephalum*,[2] MÜLLER.	Gunong Inas, Perak.
" *jalorense*, sp. nov.	Bukit Besar, borders of Nawngchik and Jalor.
Placocephalus javanus (LOMAN).	Singapore.
" *gracilis* (LOMAN).	"
" *bergendali*, v. GR.	Perak ; Kuala Aring, Kelantan.
Rhynchodemus vejdovskyi, v. GR.	Singapore.
" *nematoides* (LOMAN).	Bukit Besar, borders of Nawngchik and Jalor.

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[1], [2]. Müller, in an interesting account of these species, has given the localities in inverted order, doubtless owing to a displacement of the labels. The specimens described by him were collected by myself at the localities given above (Müller in *Zeitschr. f. wiss. Zool.* LXXIII, pp. 81-85, Taf. IV, figs. 4, 4A, 5, 5A).

DIPTERA PUPIPARA

von Dr. P. SPEISER, BISCHOFSBURG, OSTPREUSSEN

INTRODUCTORY NOTE

THE six species of parasitic Diptera in our collection were all obtained in the Patani States by Mr. Robinson and myself, and Dr. Speiser tells me that they are the first recorded from the Malay Peninsula. From a morphological standpoint, the chief interest of the collection lies in the inclusion of a species of the anomalous genus *Ascodipteron*, on the anatomy of which we hope that the same author will furnish us a paper later. From a purely bionomical point of view, the specimens of the other species enumerated and described would seem to indicate a difference of habits between the *Nycteribiidae* and the *Streblidae*, for the two species representing the former family were taken in different localities, each on a specific host; while each of the two species of *Streblidae* was taken on two different hosts not even belonging to the same genus. *Pteropus vampyrus* and *Scotophilus castaneus*, however, are both bats which sleep during the day apart from other species, in trees, or in the roofs of houses in the case of the latter; but the bats on which we took specimens of the *Streblidae* probably lived in caves, together with an enormous number of other individuals belonging to a great variety of species; and even the wingless *Diptera pupipara*, with the exception of such forms as *Ascodipteron*, are sufficiently active to make their way from one host to another. It is interesting also to notice that the Dipterous parasite of *Pteropus vampyrus* is almost as much larger than that of any other bat which we saw, as *Pteropus* itself is than any other Cheiropterous host; *Ascodipteron* must again be excepted, but when parasitism has produced such extreme changes as it appears to have done in this animal, we must always look for increase of bulk.

NELSON ANNANDALE

REPORT ON THE DIPTERA PUPIPARA

von Dr. P. SPEISER, BISCHOFSBURG, OSTPREUSSEN

DURCH gütige Vermittelung des Herrn P. H. Grimshaw in Edinburgh, wurde ich in die angenehme Lage versetzt, mehrere Gläschen mit Parasiten aus der Gruppe der Diptera Pupipara untersuchen zu können, welche die Herren Nelson Annandale und Herbert C. Robinson auf einer Reise durch die Halbinsel Malakka nebst anderen Dipteren gesammelt haben. Es findet sich dar unter einiges recht interessante, so dass ich über die Ergebnisse dieser Untersuchung hier eigens berichten möchte. Ein einziges der mir zugestellten Gläschen enthält keinen Parasiten einer Fledermaus, und dieses Stück sei daher hier vor den andern behandelt, zumal es eine bisher unbeschriebene Art der Gattung *Lipoptena* Nitzsch repräsentiert.

I. LIPOPTENA

1. Lipoptena gracilis, sp. nov.

1 einziges ♀, am 29. x. 1901 bei Jalor, im siamesischen Teil der Halbinsel, als Parasit des *Tragulus affinis*, G. R. Gray, gefangen.

Die Art steht in der Grösse unter den wenigen bekannten *Lipoptena*-Arten am nächsten der *L. pteropi* Denny[1] sowie der *L. capreoli* Rond.[2] und *L. capensis* Walk. (als *Ornithobia* nach einem ♂ beschreiben[3]), welch letztere jedoch der abweichenden Färbung wegen nicht in Betracht kommt. Von den beiden andern genannten Species unterscheidet sie sich jedoch auch leicht durch eine eigentümlich zierliche Beborstung des Abdomens, die weiter unten genauer beschrieben werden soll. Die noch etwas problematische *L. capreoli* Rond. von Cypern gehört ausserdem zu den Arten mit besonders schmalen Augen, was für unsere Art nicht zutrifft. Von *L. pteropi* Denny endlich ist sie leicht und noch dadurch unterschieden, dass von einem dunklen braunen Punkte am Ende der Schenkel bei ihr nichts zu sehen ist.

Länge 2·5 mm., Mundrand bis Hinterrand des Scutellum knapp 1 mm.

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[1] *Ann. Mag. Nat. Hist.* 1843, v. 12, p. 315, t. 17, f. 5.

[2] *Bull. Soc. ent. Ital.* 1879, v. 11, p. 14.

[3] *List of the Diptera in the British Museum*, 1849, v. 4, p. 1142.

Kopf kurz und breit, mit breiten, fast etwas hervorquellenden Augen. Die Augenränder etwas schmäler als die Augen, das matte Mittelfeld der Stirn etwa parallel begrenzend. Clypeus schwarz mit gelber medianer Einkerbung im Vorderrande, der übrige Kopf rostgelb, nur auf dem Stirndreieck noch ein schwarzer Fleck zwischen den Ocellen. Kopf ohne Borsten mit Ausnahme je einer jederseits vom Hinterrand des Stirndreiecks. Antennen knopfförmig, Maxillarpalpen kurz, kaum ein Drittel so lang als der Clypeus.

Thorax, wenn man von den Schulterecken absieht, so lang als breit; rostgelb mit je einer helleren Strieme jederseits von der Mittellinie. Quernaht des Mesonotum weit nach hinten gerückt. Schulterecken dick kegelförmig, ein Drittel so lang als der übrige Thorax; mit 3-4 mittelstarken Borsten. Auf dem Praescutum mesonoti auf jeder der durch die sehr deutliche Längsnaht geteilten Hälften vorne mit einer etwas grossen und 2-3 kleineren Borsten, vor dem Hinterrande jederseits von der Mittellinie eine ganz winzige, nahe der Dorsopleuralnaht je eine starke und davor eine ganz kleine Borste. Auf dem schmalem Scutum mesonoti vor dem Scutellum eine Reihe von vier langen und starken Borsten in gleichen Abständen. Scutellum kahl bis auf vier Borsten in der Mitte des Hinterrandes, deren mittleres Paar lang, das dünnere kurz ist. Auf den Pleuren vor der Flügelwurzel je 4-5 mittellange Borsten.

Auf der Ventralfläche des Thorax ist das aus zwei seitlichen lappen bestehende, hinten geradlinig begrenzte Prosternum deutlich, das Mesosternum ist doppelt so lang als das hinten spitzbogig ausgebuchtete Metasternum. Die Grenze zwischen den beiden letzteren steht auf der Mittellinie senkrecht. Die ganze Ventralfläche ist gleichmässig kurz beborstet.

Beine von gewöhnlicher Form und Längenverhältnissen der einzelnen Glieder zu einander, nur die Vorderschenkel sind etwas spindelförmig aufgetrieben, ohne bemerkenswerte Beborstungsverhältnisse. Von den Flügeln sind, wie stets in der Gattung *Lipoptena*, nur kurze, lappenartige Fetzen mit unregelmässig zerrissenenem Hinterrande und deutlichem Geäder erhalten.

Abdomen dorsal mit 5 oder 6 deutlich abgrenzbaren Segmenten. An der Basis liegt ein grosses Segment, das in der Mitte seines Hinterrandes tief und fast bis zur Basis eingebuchtet ist, und die Seiten des Abdomens ganz in derselben Form umfasst, wie die weichen Elytra der *Meloë* (ein Vergleich, den schon WIEDERMANN für seine als *Melophaga* beschriebene[1] *Lipoptena moschi* anwandte.) Es ist rostgelb gefärbt, und an der Basis liegt jederseits eine halbkreisaförmige etwas dunklere Platte, welche nur am Hinterrande beborstet ist. Ich weiss nicht, ob nicht vielleicht dieses Plattenpaar das eigentliche erste Segment bedeutet. Das grosse mantelförmige Segment trägt ziemlich

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[1] *Aussereuropäische zweiflügelige Insekten*, Hamm., 1830, v. 2, p. 613.

lange Borsten auf der ganzen Fläche, und eine Reihe solcher begleitet den Hinterrand, sodass sich etwas vor der Mitte des Abdomens eine zierliche, winklig gebrochene Borstenreihe findet. Hinter diesem Segmentrand folgt eine weissgelbe gänzlich borstenfreie Fläche, in welcher, schon am Hinterrande des Abdomens, jederseits ein Stigma liegt. Am Hinterrande zusammengedrängt und hier einen trapezoïdalen deutlich abgegrenzten Bezirk von etwas mehr als dem vierten Teil der Länge des Abdomens einnehmend, liegen dann die für *Lipoptena* characteristischen drei queren Segmentplatten. Sie sind schmal, fast 6 mal so lang als breit ('breit' hier aber in der Medianlinie gedacht-lang darauf senkrecht). Die beiden ersten tragen nur ein Paar ganz winzige Börstchen vor dem Hinterrande, die hinterste jederseits drei starke. Ebensoviel Borsten stehen auch auf warzenähnlichen Erhebungen jederseits vor der Analöffnung. Ventral ist ausser einer gerade begrenzten derberen Basalsegmentplatte, die an den Seiten des Hinterrandes je 3-4 längere Borsten hat, ein mediales, nicht segmentiertes Drittel von zwei seitlichen zu unterscheiden, in welchen sich die Segmentgrenzen des grossen mantelförmigen und des darauf folgenden weichen deutlich erkennen lassen. Vor der Genitalöffnung liegt nur eine nicht characteristisch configurierte, wenig dunklere Platte.

II. STREBLIDAE

2. **Nycteribosca amboinensis**, Rond.

4 Exemplare, Anfang, August, 1901, bei Biserat, Jalor, auf *Rhinolophus malayanus*, Bonhote, und *Hipposiderus larvatus* (Horsf.).

3. **Raymondia pagodarum**, Speiser[1]

2 Exemplare daselbst, auf *Rhinolophus malayanus*, Bonhote, und *Hipposiderus larvatus* (Horsf.).

Wie ich schon vermutete, ist das eine der beiden Merkmale, durch welche ich diese Art von der nächst verwandten *R. huberi* Frfld. abgrenzte, anscheinend durch zusammentrocknen der betreffenden Exemplare vorgetäuscht worden. Bei diesen malayischen Exemplaren ist das Scutum mesonoti auch nicht nur ⅛, sondern ½, so lang wie das Praescutum; dagegen besteht das Merkmal des Flügelgeäders völlig zu Recht. Beide Exemplare stimmen im Geäder genau mit meiner Abbildung überein (*l.c. p.* 49, fig. 7).

III. NYCTERIBIIDAE

4. **Nycteribia (Acrocholidia) chlamydophora**, sp. nov.

2 ♂, 8 ♀ auf *Scotophilus castaneus* (Horsf.), bei Biserat bei Jalor am 27th June, 1901; 1 ♂, 1 ♀ auf derselben Fledermausart am Bukit Besar in 2,500 Fuss (760 m.) Meereshöhe.

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[1] Archiv. f. Naturgeschichte, Jahrgg. 1900, p. 50.

Die Art reiht sich in meiner Bestimmungstabelle der Nycteribien[1] unter 8 neben *N.* (*A*) *dispar*, mihi von Neu Guinea ein, an deren ♀ sie durch das stark entwickelte Basalsegment des ♀ Abdomens erinnert.

Sie ist 2-2, 5 mm. lang, gleichmässig braungelb gefärbt.

Kopf von ganz gewöhnlicher Form, eine Gruppe Borsten vorne am Scheitel, die Wangenränder spärlich beborstet, und je zwei kleine Borsten jederseits etwas unter der Stelle, wo sonst die Augen liegen. Thorax dorsal ohne irgendwelche Besonderheiten, auf den den Mesopleuralnähten entsprechenden Leisten (*l.c.* p. 18-19) steht eine gebogene Reihe von 10-12 schwachen Börstchen. Das Ctenidium hat keine auffallend dünnen Zähne. Ventral ist der Thorax länger als breit, der Hinterrand nur ein wenig in der Mitte eingebuchtet, die Längsnaht hinten grubig vertieft.

Abdomen des ♀ : dorsal wie ventral werden die vorderen 2 Drittel eingenommen durch ein sehr langes Basalsegment von characteristischer Configuration. Die dorsale Fläche ist ganz glatt, nur sehr spärlich beborstet, in der Mitte durch eine hellere, nach hinten breiter werdende Linie gewissermassen in zwei Hälften gespalten, deren jede hinten medial mit einem dunkeln spitzen mit langen dunkeln Borsten besetzten Zipfel endet. Bei einem Exemplar fehlt diese Spaltung, sodass die Hinterrand als ganzrandig, aber in der Mitte breit zipfelig vorgezogen beschrieben werden muss. Die drei folgenden Segmente sind durch je zwei seitliche Gruppen von Borsten, markiert, auf den zweitfolgenden stehen mitten inne noch 2 Borsten. Ventral hat das Basalsegment eine dunkle Mittellinie, ist gleichmässig behaart und trägt am ganz geraden Hinterrande ein sehr dichtes Ctenidium von etwa 34-42 Zähnen, welches nur die mittleren 2 Drittel einnimmt und nach aussen noch durch je einige Borsten fortgesetzt wird. Das folgende Segment ist nur an den Seiten etwas dunkler braun, der Hinterrand durch eine spärliche in der Mitte unterbrochene Borstenreihe markiert, etwas eingebuchtet. Das dritte besteht aus zwei dreieckigen seitlichen dunkleren Stücken, welche am Hinterrande beborstet sind. Dann folgt eine braune, hoch bogenförmig nach vorn geschwungene dünne Chitinleiste, auf der nur 4-5 Paar ganz schwache Borsten stehen, endlich die braune, breite, durch einen hellen Längsstreifen geteilte Platte vor der Genitalöffnung, welche den erwähnten Bogen ausfüllt, nur ganz vorn 2 Paare und am Hinterrande einige schwache Börstchen trägt.

Abdomen des ♂ : dorsal sind alle Segmente mit Ausnahme des ersten mit einigen wenigen Börstchen besetzten auf der Fläche ganz unbeborstet. Die

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[1] Arch. Naturg., v. 67, 1901, p. 68. Gerade an dieser Stelle muss die Tabelle wesentlich umgeändert werden, indem *N. minuta* Wulp und *N. roylei* Westw. an durchaus anderer Stelle einzureihen sind. Das Genauere will ich an anderer Stelle bringen.

Borsten am Hinterrande sind am ersten Segment gleichmässig lang, je weiter nach hinten, desto länger werden die mehr seitlich stehenden Borsten, bis am Hinterrande des fünften wieder nur kurze und spärliche Borsten zu finden sind. Die drei ersten Segmente sind gleich lang, das 4te und 5te unter sich gleich, etwa ⅔ der einzelnen vorherigen, das Analsegment ziemlich kurz und stumpf. Ventral sind die Segmente 1, 2, 3, 4 + 5 unter sich gleich lang, 1-3 auf der Fläche beborstet, 1 mit dem Ctenidium, 2 und 3 am Rande spärlich mit schwachen kurzen Borsten besetzt, 4 + 5 an der Seite des Hinterrandes mit ziemlich langen Borsten, in der Mitte zwischen kürzeren Borsten mit 4 Paaren kurzer starker, schwarzbrauner Dornen. Die Haltzangen gerade, schmal und ziemlich lang, an den Hinterrand des vorletzten Segmentes nicht heran reichend, braun, am Ende schwarzbraun bis schwarz.

5. **Cyclopodia horsfieldi**, de Meijere[1]

Bei Patani 1 ♂ auf *Pteropus vampyrus* (Linn.), bei Biserat bei Jalor 6 ♂, 3 ♀ auf *Pteropus vampyrus* (Linn.) und 1 ♂, 1 ♀ auf *Pteropus vampyrus* (Linn.).

IV. ASCODIPTERON

6. **Ascodipteron siamense**, sp. nov.

Mr. ANNANDALE hat dank seiner Aufmerksamkeit das Glück gehabt, auf einer Fledermaus (*Hipposiderus bicolor* Temm.) von Biserat bei Jalor einen Parasiten aus dieser Familie zu entdecken, von der bisher nur 3 Exemplare bekannt geworden sind. Das Exemplar ist zusammen mit dem umgebenden Gewebe für anatomische Untersuchung conserviert, die ich hier leider wegen Mangel an Hilfsmitteln nicht vornehmen kann. Ich bin daher auf die zu Tage liegende Endplatte des Abdomens angewiesen für einen Vergleich mit den beschriebenen Species. Der geographischen Lage des Fundorts nach kommt wohl nur *Ascodipteron phyllorhinae*, Adensamer[2], aus Java in Betracht, diejenige Art, durch welche wir mit der so höchst eigentümlichen Gattung zuerst bekannt wurden. Von ihr unterscheidet sich das vorliegende Stück in der Stellung der Stigmen auf der Endplatte. Die vier grossen, dorsal von der 'Terminalspalte' (Genitalöffnung) gelegenen Figuren stehen nämlich in einer annähernd horizontalen Reihe, die beiden ventral gelegenen etwas dichter an der Spalte, als Adensamer zeichnet (*l.c.*, tab. I, fig. 6), letztere etwa so wie sie bei *A. lophotes* Monticelli[3] stehen. Ob die beiden kleineren 'Chitinringe,' welche zwischen 'Terminalfurche' und 'Terminalspalte' auch bei dem jetzt gefundenen Stück ganz ebenso wie bei Adensamers vorhanden sind, auch Stigmen sind, und die Terminalfurche thatsächlich die Analöffnung ist, wie Monticelli annimmt, kann ich leider nicht entscheiden. Da man wohl vielfach nur auf die Untersuchung des freiliegenden Knopfes angewiesen sein wird und dieser ein bei allen drei Funden verschiedenes Bild bietet, möchte ich ihn zur specifischen Trennung verwerten und dabei dem von Messrs. ANNANDALE und ROBINSON gefundenen Stück zugleich auch einen Namen geben. Die drei Arten lassen sich dann folgendermassen scheiden :

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[1] *Tijdschr. Ent.*, 42 *Deel*, 1899, p. 153.

[2] *S. B. Ak. Wien, Math.-nat. bl.*, Bd. 105, I Abt. p. 400 ff.

[3] *Ricerche fatte nel Labor. Anat. normale d. R. Univ. Roma ed in altri. Labor. biol.* Vol. VI, fasc. 4, 1898, pp. 201-230, tav. IX.

A.—Von den 4 grossen dorsalen Stigmen steht das mediale Paar dorsal vom lateralen. *A. lophotes* Monticelli.

B.—Von diesen 4 Stigmen steht das mediale Paar nicht dorsal vom lateralen.

(1) Die 4 stigmen liegen fast in einer horizontalen Reiee. *A. siamense* sp. nov.

(2) Das mediale Paar liegt weit ventral vom lateralen. *A. phyllorhinae* Adensamer.

APPENDIX

Dr. SPEISER informs us that no pupiparous Diptera have hitherto been recorded from the Malay Peninsula, but enumerates the following species from neighbouring countries. We hope that he may give an account of the anatomy of *Ascodipteron siamense* in a subsequent paper.

From BENGAL :—

Hippoboscidae

Hippobosca maculata, LEACH (1818) (= *aegyptiaca* var *bengalensis*, ORMEROD).

Nycteribiidae

Cyclopodia hopei, WESTW. (♂) (1839).

From BURMA :—

Hippoboscidae

Hippobosca longipennis, FABR. (1805) (exact description prepared by SPEISER).
Ornithoctona nigricans, LEACH (1818).
Ornitheza andaiensis, ROND. (1878).

Streblidae

Nycteribosca gigantea, SPEISER (1900).
Nycteribosca amboinensis, ROND. (1878).

Nycteribiidae

Penicillidia euxesta, SPEISER (1901).
Eucampsipoda hyrtli, KOL. (1856).
Cyclopodia ferrarii, ROND. (1878).

REPORT ON THE BATRACHIANS AND REPTILES

By G. A. BOULENGER, F.R.S.

INTRODUCTORY NOTE

THE Batrachians collected by Mr. Robinson and myself, on which, with the Reptiles, Mr. Boulenger has been kind enough to furnish a report, were obtained in the Patani States, a few of the commoner species being also represented by duplicates from Perak or Selangor. The Reptiles are mostly from the same district, but some interesting forms were obtained in Selangor by Mr. Robinson, and the type of a new species of *Testudo* and several snakes and lizards were collected by us together in South Perak. In preparing the notes I have added to Mr. Boulenger's report, I have used Mr. Robinson's observations as well as my own, some of the latter having been made as long ago as 1899; and the descriptions of the colour of the living animals were mostly our joint work. From a bionomical standpoint, two interesting features in the collection are the evidence it affords (1) of the superior conspicuousness of coloration possessed by *young* individuals of certain species of Reptiles, and (2) of the mimicry of the deadly *Naia bungarus* by a non-venomous snake.

It should be noted that while the 'Skeat' collection of Reptiles from the Patani States, which was made by myself, was peculiarly rich in snakes, our attempt in the present one was to obtain as representative a series of the lizards of the district as possible, so that the two collections supplement one another in a very interesting way.

NELSON ANNANDALE

REPORT ON THE BATRACHIANS AND REPTILES

By G. A. BOULENGER, F.R.S.

THE collection made by Messrs. Annandale and Robinson, and kindly entrusted to me for study, affords a substantial supplement to our knowledge of the herpetology of the Malay Peninsula, recently enriched by the efforts of Messrs. S. Flower, A. L. Butler, and L. Wray, and by the 'Skeat' Expedition, in which Mr. Annandale himself took part, and the results of which have been reported upon by Mr. Laidlaw. The present report contains descriptions of two new frogs, two new tortoises, a new lizard, and a new snake; whilst three lizards (*Mabuia siamensis*, *Lygosoma quadrivittatum*, *Dibamus novae-guineae*) and one snake (*Ancistrodon rhodostoma*) are recorded for the first time from the Malay Peninsula.

BATRACHIA

ECAUDATA

PELOBATIDAE

1. Megalophrys montana, Kuhl

(Plate V, Fig. 1.)

A young specimen, 26 mm. from snout to vent, and numerous larvae from Bukit Besar (2,500 feet). A half-grown male from Jalor.

The curious larvae, with their enormous funnel-shaped lips, were first described and figured by Professor Max Weber,[1] and further specimens from Bukit Besar, obtained by the 'Skeat' Expedition, and identified by me, have been noticed by Mr. Laidlaw,[2] and figured by Dr. Gadow, in the Reptile volume of the *Cambridge Natural History*, p. 60.

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[1] *Ann. Jard. Bot. Buitenzorg*, xv, Suppl. ii, 1898, p. 5.

[2] *Proc. Zool. Soc.* 1900, p. 889.

The superciliary 'horns' are merely indicated in the half-grown specimen and in a young perfect specimen, and no trace of them is to be seen in one, only half as long, which has retained the tail fully developed. The tympanum is distinct. Until more specimens have been examined, it is, in my opinion, safer to designate this frog by the varietal name *aceras* than to describe it as a new species.

'The adult appears to be nocturnal, and all the specimens that I have seen under natural conditions have been taken in dead tree-trunks lying on the jungle floor. The larvae were obtained from a pool, not more than a foot-and-a-half square, in a little watercourse of partially artificial origin. I took a number of specimens in the same pool at the beginning of May, in 1899. They occupy the extreme edge, where the water is so shallow that their tails almost touch the bottom when they are suspended from the surface film; and when the pool dries up, as it does in comparatively dry weather, they conceal themselves among the mud and dead leaves that remain, living, at any rate for some days, under such conditions. Nevertheless, we were unable to keep them alive in captivity for more than a day or two, probably because we did not put them in sufficiently shallow water. Their food, judging from the contents of their intestines, consists of algae and minute organisms, both animal and vegetable. I do not believe that it is possible for them to rasp the leaves of water-plants, as Dr. GADOW suggests. As a rule, they hang from the surface film, as in Dr. GADOW's figure, but occasionally they sink to the bottom, where they often lie on one side for a few minutes before returning to the surface. The moment that they commence to sink, the funnel round the mouth collapses, taking on the form of a pair of horns, curling backwards along the side of the head; but, as they touch the surface again, it re-expands into a regular parachute form: I was able to obtain photographs illustrating this action. It is probable that development is liable to be protracted by drought, as we found specimens in the same pool both at the end of April and again in September and October, and those taken in the autumn were, with a few exceptions, only a very little further advanced than those taken in spring, an unusually dry summer having intervened. It is, however, possible that they may have belonged to different broods, and I am only led to make the suggestion that this was not so, by the fact that on one occasion, even in September, when the rains should be commencing, the pool dried up almost completely, and the tadpoles took refuge in the mud. The funnel round the mouth exhibits some curious histological features, which will, I hope, be described in a subsequent paper.'

BUFONIDAE

2. **Bufo asper,** Gravenh.

Bukit Besar, 2,500 feet, and Sungkei, Batang Padang, South Perak.

'A common species, both in Perak and in the Siamese States. It is generally found near human dwellings or in secondary jungle, but occasionally penetrates into thick forest country.'

3. **Bufo parvus,** Blgr.

Sungkei, South Perak.

4. **Bufo melanostictus,** Gthr.

Jalor and Selangor.

'Probably the commonest terrestrial Batrachian in most parts of the Peninsula, but I have never seen it in thick jungle. In the town of Senggora it issues forth from holes in the city wall every evening, or after a shower, in enormous numbers.'

ENGYSTOMATIDAE

5. **Callula pulchra,** Gray

Jalor and Selangor.

'Common in the Patani States and Senggora, apparently less so on the west side of the main range. It is chiefly nocturnal in its habits, often hiding during the day among the cocoanut-husks and other refuse under native houses. I have seen a specimen seated in the hollow of a dead branch, surrounded by what appeared to be the remains of an ants' nest; but all the ants were dead, whether killed by contact with the Batrachian or not, I cannot say, though it seems probable that this may have been the case. I have noted elsewhere,[1] how the way in which this toad inflates itself on being disturbed causes its conspicuous coloration to be displayed.'

6. **Microhyla ornata,** D. & B.

Mabek, Jalor.

'Not uncommon in the long grass of clearings surrounded by jungle.'

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[1] *Proc. Zool. Soc.* 1900, p. 857.

RANIDAE

7. **Oxyglossus lima,** Gravenh.

Cape Patani.

'Common in the freshwater pools among the sandy Casuarina woods on Cape Patani; appears to be largely an aquatic species. Local in distribution.'

8. **Rana macrodon,** D. & B.

Bukit Besar, 2,500 feet; and Telôm, Perak-Pahang boundary, 4,000 feet (young specimen).

'Both specimens were taken hiding under stones at the edge of jungle streams.'

9. **Rana tigrina,** Daud.

Jambu, Jhering.

'The specimen was taken on the mud of the brackish mangrove swamp at the mouth of the Jambu River. In such environment it is not uncommon, occupying holes exactly similar to those of the mangrove crabs. I have seen a specimen dive into a strongly saline pool and remain under the surface for some minutes. It is also abundant, judging from its characteristic croaking, in the swamps of the Taleh Sap at Lampam, in Patalung, these swamps being possibly brackish at certain seasons of the year.'

10. **Rana limnocharis,** Boie

Jalor.

'The common rice-field frog, both of the Patani and the Federated Malay States. In dry weather it is occasionally found in the jungle, and it is generally common on elephant tracks in all places where the ground is sufficiently soft to retain impressions wherein water may collect. Puddles thus formed are a favourite spawning-place, but the eggs are also frequently laid in ditches and pools. They form a feebly coherent, one-layered mass of no great size that floats on the surface of the water, which oftens becomes quite hot under the mid-day sun. The ova appear to have about half the diameter of those of *R. temporaria*, and to hatch within a week. In Jalor, spawning takes place throughout the summer months, but most frequently in June or July, apparently reoccurring after every heavy fall of rain. *R. limnocharis* sits in great numbers along the edges of the embankments of flooded rice fields, and when a person or large animal approaches, leaps hurriedly, with a splash, into the water. It swims away for a yard or two, and then returns abruptly to the embankment, only a few feet in front of its former station. So rapidly is this manoeuvre executed, that the frog is often re-established on dry land before the cause of its disturbance comes on a level with it, in which case it again leaps off and acts as before. At night and during breeding times in summer, the rice-field frogs (in Malay *berkatak bendang*) are very noisy, their croaking somewhat resembling the syllables 'gông-gûng, gông-gûng,' repeatedly and monotonously reiterated. In Jalor, Malay children imitate it very accurately by means of an ingenious toy. They take a narrow strip of rattan or other flexible but fairly stiff material, and split it for about half its length; on each section they fasten a large *Ampullaria* shell, and then draw a stick rapidly backwards and forwards between the two shells.

'In a number of specimens of *R. limnocharis*, taken from the same field and on the same day, the colour variation is considerable, some being devoid of a pale mid-dorsal line, which in some is white, in some green, in some pink, and in some tinged with yellow; while, occasionally, the whole of the dorsal surface, which is usually of a dull mottled-grey, is suffused with bright green. This frog forms a very important item in the diet of several reptiles and of the numerous wading birds that collect in the rice fields during the rains of autumn and winter.'

11. **Rana erythraea**, Schlg.

Mabek, Jalor.

'I do not remember having seen this frog either in the coast lands of the Patani States, in the rice fields of Jalor and Nawngchik, or in the comparatively dry jungle on the limestone hills of the former state; but it is not uncommon at Mabek, sitting on bushes at the edge of the stream, into which it leaps as soon as any disturbance occurs in its vicinity. Several may sometimes be seen on one bush. Near Kuala Lumpur, as Mr. ROBINSON has pointed out to me, it is common in the rice fields.'

12. **Rhacophorus leucomystax**, Gravenh.

Kampong Bayu and Biserat, Jalor.

'This species is fairly common in the neighbourhood of human dwellings, both in the Patani States and other parts of the Peninsula, though being largely nocturnal, it is not very often seen. Its spawn is never, so far as I am aware, deposited in the water, but is either suspended from the leaves of trees, the eaves of houses, or some other point projecting over water or damp soil, or else is laid on the edge of buffalo-wallows or the embankments of rice fields. The larvae appear to be able to develop considerably, at any rate to assume an elongate form, before the froth, in which they are enveloped, comes in contact with water ; but if the direct rays of the sun fall upon them, as is often the case, and if they are not washed into some pool or puddle within a week or so, they perish. The frog is by no means sagacious in placing its spawn.[1]

Rhacophorus leucomystax has greater powers of colour change than any other frog with which we met, the changes being due partly to changes in the surroundings, or perhaps rather to variations in the intensity of reflected light, and partly to its own emotions. A specimen sitting among green leaves in the open is usually of a yellowish-green shade, while one confined in a comparatively dull environment becomes darker ; but sluggish specimens, which may be diseased, are generally dark ; and if a green specimen is handled, it also becomes dark, the bars on its hind legs being very conspicuous. We saw one specimen, which, seated on a withered banana leaf and surrounded with other withered trunks and foliage, had assumed the dull grey of such surroundings exactly ; even the iris, which is habitually yellow or brown, having become of this colour. This was at mid-day, in fairly bright light, but the individual appeared to be unusually comatose.'

13. **Rhacophorus robinsonii**, sp. nov.

(Pl. V, Fig. 2).

Vomerine teeth in two strong and oblique series touching the inner front edge of the choanae. Snout narrow, as long as the diameter of the orbit ; loreal region nearly vertical, slightly concave ; nostril a little nearer the end of the snout than the eye ; interorbital space a little broader than the upper eyelid ; tympanum very distinct, two-thirds the diameter of the eye. Fingers rather short, much depressed, entirely webbed, the disks as large as the tympanum ; toes webbed to the disks, which are a little smaller than those of the fingers ; subarticular tubercles small but very prominent ; a very small inner metatarsal tubercle ; no tarsal fold. Tibio-tarsal articulation reaching between the eye and the tip of the snout. Skin smooth, granulate on the belly and under the thighs ; no dermal flaps at the heels or above the vent ; a strong fold above the temple. Pinkish-brown above, bluish-grey on the sides of the body and limbs ; sides of head darker purplish-grey, which above is sharply defined on the canthus rostralis ; ill-defined dark spots on the back ; limbs with greyish-brown cross-bars ; interdigital webs blackish, with light veins ; whitish beneath, throat mottled, belly marbled with grey. From snout to vent, 73 mm.

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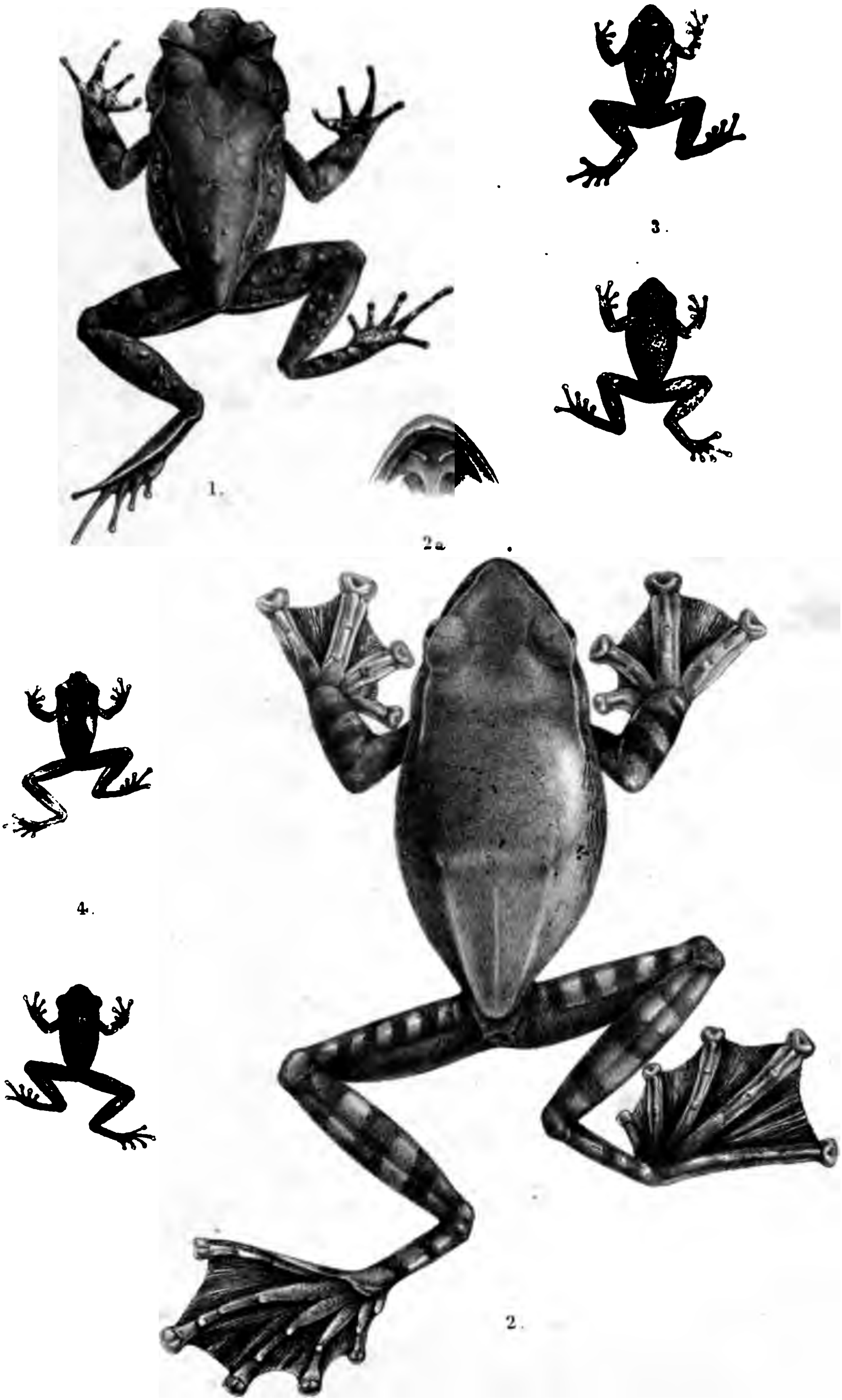
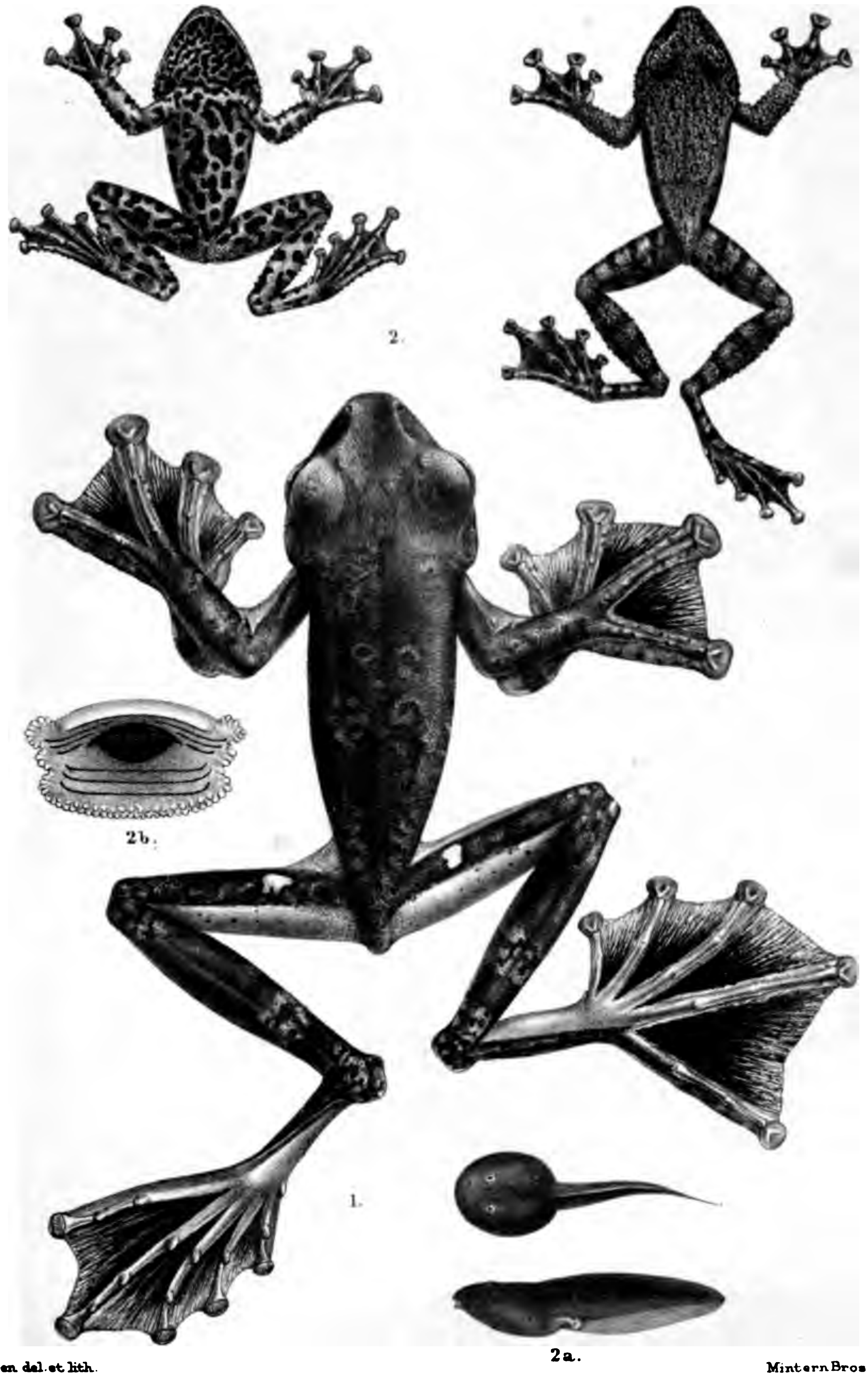
[1] Cf. Gadow's *Amphibia and Reptiles*, p. 247.



J. Green del. et lith. Mintern Bros. imp.

1. MEGALOPHRYS MONTANA, VAR. ACERAS. 2. RHACOPHORUS ROBINSONII.
3. 4. IXALUS LARUTENSIS.



Green del. et lith. Mintern Bros. imp.

1. RHACOPHORUS NIGROPALMATUS. 2. IXALUS HORRIDUS.

This fine new *Rhacophorus* is very near *R. fasciatus*, Blgr., from Sarawak. It differs in the more rounded snout, the more anterior nostril, a larger tympanum, and strikingly in colouration. *R. shelfordi*, Blgr., also from Sarawak, which agrees very closely in most respects with this species and with *R. fasciatus*, is distinguished by having the disks of the fingers considerably smaller than the tympanum.

A single specimen, from Bukit Besar. 2,500 feet.

'The specimen was taken in the morning, seated, a foot or two above the ground, on the leaf of a herbaceous plant growing in thick jungle. It was very sluggish, making no attempt to escape, though considerable disturbance had been caused by our passage in its immediate neighbourhood. The fore-legs were folded beneath the chest, and the hind legs were pressed close to the sides of the body, beneath which the feet were partially concealed; the snout was somewhat depressed. The colour of the whole of the dorsal surface was a pale coffee, which so closely resembled the shade assumed by many dying leaves that the frog, with its leaf-like outline in the attitude described, was, at first sight, mistaken for a leaf that had fallen from the trees above and had accidentally lodged on the plant; Mr. Robinson, a Malay who accompanied us, and I were all completely deceived. At this time the purplish-grey of the side of the head was black, and extended in a well-defined band down each side. When the specimen was handled, its colour became darker, and mottlings of an ill-defined character, as well as the cross-bars on the limbs, made their appearance, as they so often do in species of *Rhacophorus*. The specimen permitted itself to be captured almost without a struggle, after waiting while a camera was fetched and a photograph taken.

14. **Rhacophorus nigropalmatus**, Blgr.

(Pl. VI, Fig. 1).

This handsome frog, probably the very species alluded to by Wallace[1] as the 'flying frog,' was first described from Sarawak. It has since been rediscovered in Sumatra[2] and in Upper Perak.[3]

A female specimen was obtained at Mabek, Jalor, on the 22nd July, 1901. Its colour in life was as follows:—'Dorsal surface pale grass green, powdered with white; a conspicuous white mark on the dorsal surface of the thigh; on the dorsal surface of the feet, the green changes gradually into orange; membrane of the feet, orange marked with black; sides of the body orange, changing into deep salmon pink on the abdomen and under surface of digits ; throat and chest cream-colour.'

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[1] *Malay Archipelago* I, p. 60.

[2] F. Werner, *Zool. Jahrb. Syst.* XIII, 1900, p. 496.

[3] S. Flower, *Proc. Zool. Soc.* 1899, p. 899.

The specimen, a female, measures 88 mm. from snout to vent. The largest specimen, from Bidi, Sarawak, in the British Museum, measures 100 mm.

The male is still unknown.

'Mr. ROBINSON, who took the specimen, notes that it dropped almost vertically from a tall tree growing at the edge of a large clearing in the jungle, while the individual obtained by Mr. L. WRAY, in Upper Perak, was sitting on a tree-trunk.[1] Beyond the statement of the Chinamen who procured WALLACE his specimen, there appears to be no evidence to prove that the "flying frog" does use its enormous feet to support it in the air, and, so far as we could see, it did not appear likely, from the condition of the web in the living animal, that their purpose was that assigned to them by the discoverer of the species. The seemingly gorgeous coloration may very possibly be protective in its proper surroundings, for, with the exception of the black and orange on the feet, the colours are not arranged so as to contrast with one another, and, as I have pointed out elsewhere,[2] the most brilliant colours, provided only their arrangement be correct, may serve for concealment under conditions of light common in the Malay jungle. In the plate, our specimen of *R. nigropalmatus* is represented as it now is, for the marblings on its dorsal surface only became apparent after it was plunged into spirit. It is interesting to notice that markings of a similar character appear on the bodies of all the three species of *Rhacophorus* taken, if they are roughly treated, and probably also if they are in bad health. These markings are not conspicuous enough to be instances of warning coloration, but are rather analogous to the blushing or paling of a human being under the influence of emotion or in pathological conditions.

'Within the limits of the genus *Rhacophorus* we have the three main divisions, into which the phenomena of protective coloration may be divided, all well illustrated ; in the first place, there are species, like *R. leprosus*, which are coloured to suit their habitual environment, having little power of adapting their colour to any other environment ; in the second place, there are species, like *R. leucomystax*, which can, to a certain extent, adapt themselves so as to be concealed in environments of several different kinds ; while in the third, there are species, like *R. robinsonii*, which appear to resemble some definite object, in this case a dying leaf, not necessarily to be found in the environment in which they are seated for the moment, but which might very well occur in surroundings of the kind.'

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[1] *Proc. Zool. Soc.*, 1899, p. 899.

[2] *Proc. Zool. Soc.* 1900, pp. 849-852.

15. Ixalus larutensis, Blgr.

(Pl. V, Figs. 3 and 4)

Snout rounded or obtusely pointed, as long as the diameter of the orbit; canthus rostralis distinct; loreal region concave; nostril a little nearer the end of the snout than the eye; interorbital space as broad as the upper eyelid; tympanum moderately distinct in the adult, indistinct in the young, half the diameter of the eye. Fingers free, toes half webbed; discs of fingers as large as the tympanum; subarticular tubercles moderate; a small inner metatarsal tubercle. The tibio-tarsal articulation reaches between the eye and the tip of the snout. Upper parts smooth, or with small flat warts; throat, belly, and lower surface of thighs granulate. Grey brown or reddish-brown above, with dark brown symmetrical markings, a cross-band between the eyes being constant; usually a)(or)-(-shaped marking on the anterior part of the body; sides of body and of thighs with white spots on a brown ground, or between a brown network; a dark-brown lumber spot may be present; limbs with dark cross-bands; lower parts white, spotted or speckled with brown. One of the two young specimens from Jalor has a whitish vertebral line from end of snout to vent, a similar line along the upper surface of the thigh and leg and another from the chin to the breast; the lower parts are obscured by brown mottlings.

From snout to vent, 35 mm.

This species was described in 1900[1] from specimens obtained in the Larut Hills, between 4,000 and 4,500 feet altitude. Two young specimens from Bukit Besar (2,500 to 3,500 feet) are in Messrs. Annandale and Robinson's collection, and are here figured.

'The specimens were found among dead leaves, to which they bore a remarkable resemblance, on the jungle floor.'

16. Ixalus horridus, sp. nov.

(Pl. VI, Fig. 2).

Very similar in general appearance to *Rhacophorus leprosus*, Schlg., and *R. costicalis*, Blgr. Head rather strongly depressed, the obtusely pointed snout a little longer than the diameter of the orbit; canthus rostralis obtuse; loreal region concave; nostrils close to the end of the snout; interorbital space a little narrower than the upper eyelid; tympanum distinct, as large as the eye. Fingers half webbed, with large terminal expansions which are broader than long, and as broad as the diameter of the tympanum; toes webbed to the disks, which are smaller than those of the fingers; terminal phalanx bifurcate; subarticular tubercles of fingers and toes very small; a small, oval, inner metatarsal tubercle. The tibio-tarsal articulation reaches between the eye and the tip of the snout. Upper parts with very prominent, irregular large warts, themselves studded with granular asperities in the adult ; throat, breast, lumbar, and antero-femoral region and lower surface of limbs smooth ; belly and anal region with large flat granules. Dark warm-brown above, with rather indistinct blackish spots on the body and regular cross-bars on the limbs ; the granular asperities greyish ; a large black lumbar spot ; webs blackish ; lower parts white ('bright blue-grey' in life), largely spotted and marbled with black. Male, with a large soft pad on the inner side of the first finger and an internal vocal sac.

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[1] *Ann. Mag. Nat. Hist.* (7) VI, p. 187 (1900.)

From snout to vent, 40 mm.

Description of Tapole. Body much depressed, a little longer than broad, its length one and three-fifths to one and three-fourths in that of the tail. Eyes superior, two and one-half to three diameters apart ; distance between nostrils about two-thirds interocular width. Mouth ranid in type, elliptical, its width a little greater than the interocular. Beak black, sides and lower edge of the lip fringed with papillae, upper lip with a long series of fine horny teeth, followed on each side by three series, three interrupted series of teeth on the lower lip. Spiraculum on the left side, in the posterior third of the body, directed straight backwards. Anus turned to the right, close to the lower edge of the tail. Tail two and two-thirds to three times as long as deep, rounded at the end, the depth of the muscular portion, in the middle of the length, about half the total depth, the upper caudal crest does not extend on the body.

The length of the numerous specimens, which are uniform dark-brown or blackish, with the lines of sensory organs distinct and whitish, varies between 15 mm. and 50 mm.

'A considerable number of adults of this species inhabited a tree in the jungle near our camp on Bukit Besar, occasionally manifesting their presence by low grunts or croaks, uttered singly at intervals. The tree was one of those from the lower part of whose trunk large buttresses project, and in its case these buttresses had coalesced in pairs, so as to form cavities, which contained several gallons of rain water and dead leaves. The frogs deposited their spawn on the trunk in frothy masses about the size of a cricket ball, a foot or two above the surface of the water in these cavities, which was of a deep brown colour. The masses resembled those produced by *Rhacophorus leucomystax*, but were rather smaller and paler in colour. I found that if they were not washed down by the rain into the water within three or four days, the froth dried up and the ova perished. The cavities were haunted by a snake, *Tropidonotus chrysargus*, two specimens of which were taken feeding on the spawn, despite the froth in which it was embedded.

'The ova were quite devoid of colour, but the larvae soon assumed an almost uniform velvety black hue. The blue grey, so conspicuous on the belly of the adult, did not commence to make its appearance until the hind legs were fairly well developed, and was much less intense on the young frog than in the older specimens, being in very young individuals merely greyish-white. The dorsal surface of the adult so closely resembled the bark of the tree on which our specimens were taken, that I was unable to distinguish any of the individuals captured in the shadow of the buttresses, and only knew of their presence through their croaking or when they moved; they were caught with a net in the water in the cavities, into which they dived when the trunk was tapped.

'The resemblance, both above and below, between this species and *Rhacophorus leprosus*, known from the mountains of Perak, is very close indeed, and is probably an instance of adaptive resemblance or "convergence," though the two frogs belong to closely allied genera, seeing that they both differ widely in appearance from the typical members of their respective genera. Their habits appear to be identical,[1] and it is probable that a very close resemblance also exists between their larvae, which live under very similar conditions, but it is not known whether the species are found together. It would almost seem as if there was some physiological connexion in these genera between a warty, bark-like dorsal surface, and a blue-grey belly, mottled with black, as it is most improbable, in consideration of the conditions under which these frogs live, with their bellies closely pressed against the bark of trees, that the conspicuous coloration of the ventral surface is an advertisement to enemies. The coloration does not appear to be altogether parallel to that of *Bombinator*, as the species of the latter genus are said to display the brilliant orange or yellow of their bellies at the sides of the body, though the fable that they turn over on their backs to do so has been refuted.[2] It may be pointed out, however, as Dr. Gadow himself confesses, that it is not always possible to induce tame individuals of this genus to adopt the 'warning attitude,' and that it is just possible that the attitude has primarily no connexion with the coloration of the ventral surface, as it is one paralleled by the common attitude of alarm of many animals which are soberly coloured below, even by certain Orthoptera and Crustaceans. In this case, boldly contrasting patterns on the belly of these four Batrachians may very well have a common origin in each instance, though we cannot at present state their object.'

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[1] Cf. L. Wray, *Perak Museum Notes* and *Journ. Straits Branch Roy. Asiat. Soc.*, 1890, p. 144.

[2] Gadow, *Amphibia and Reptiles*, pp. 156, 157.

REPTILIA

CHELONIA

TESTUDINIDAE

1. **Batagur baska**, Gray

A young specimen from the lower reaches of the Patani River.

2. **Damonia subtrijuga**, Schlg. & Müll.

Lower reaches of Patani River.

3. **Cyclemys amboinensis**, Daud.

Kampong Jalor.

'Also common in the pools on Cape Patani, where it is frequently kept as a pet by the Malay children ; its fat is used as a medicine for fever.'

4. **Cyclemys platynota**, Gray

Kampong Jalor.

5. **Cyclemys annandalii**, sp. nov.

(Plates VII and VIII)

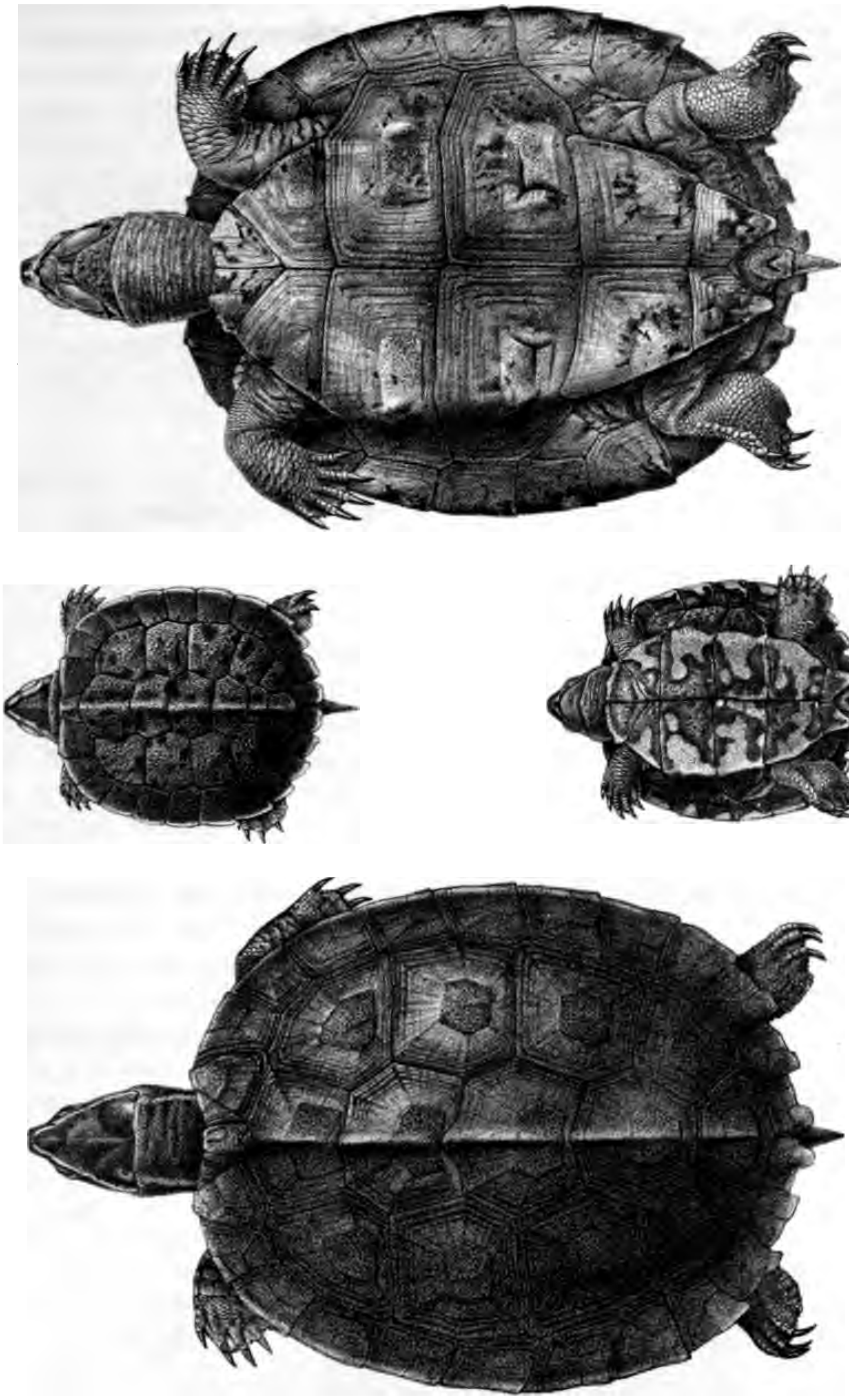
Belongs to the first section of the genus, including *C. platynota*, *dhor*, and *mouhoti*, characterized by the plastron not completely closing the shell and being emarginate posteriorly, and by the separated posterior margin of the carapace. Agrees with *C. platynota* in having the suture between the pectoral shield and the marginals longer than that between the abdominal and the marginals, but differs chiefly in the stronger bicuspid beak, the denticulate border of the upper jaw, the more slender zygomatic arch of the skull, the larger axillary shield, the smaller anal shields with a deeper notch between them, and, normally, in the absence of a sixth vertebral shield.

This species, with which I have much pleasure in connecting the name of Mr. ANNANDALE, is founded on three specimens from Kampong Jalor ; two young in spirit, and a large male, preserved dry, with skin and skeleton.

A. Description of the Young.

Carapace depressed and unicarinate, with serrated posterior margin, vertebral shields broader than long, as broad as or a little narrower than the costals, first as broad, or nearly as broad, as the second. Plastron narrower than the opening of the shell, with deeply notched hind

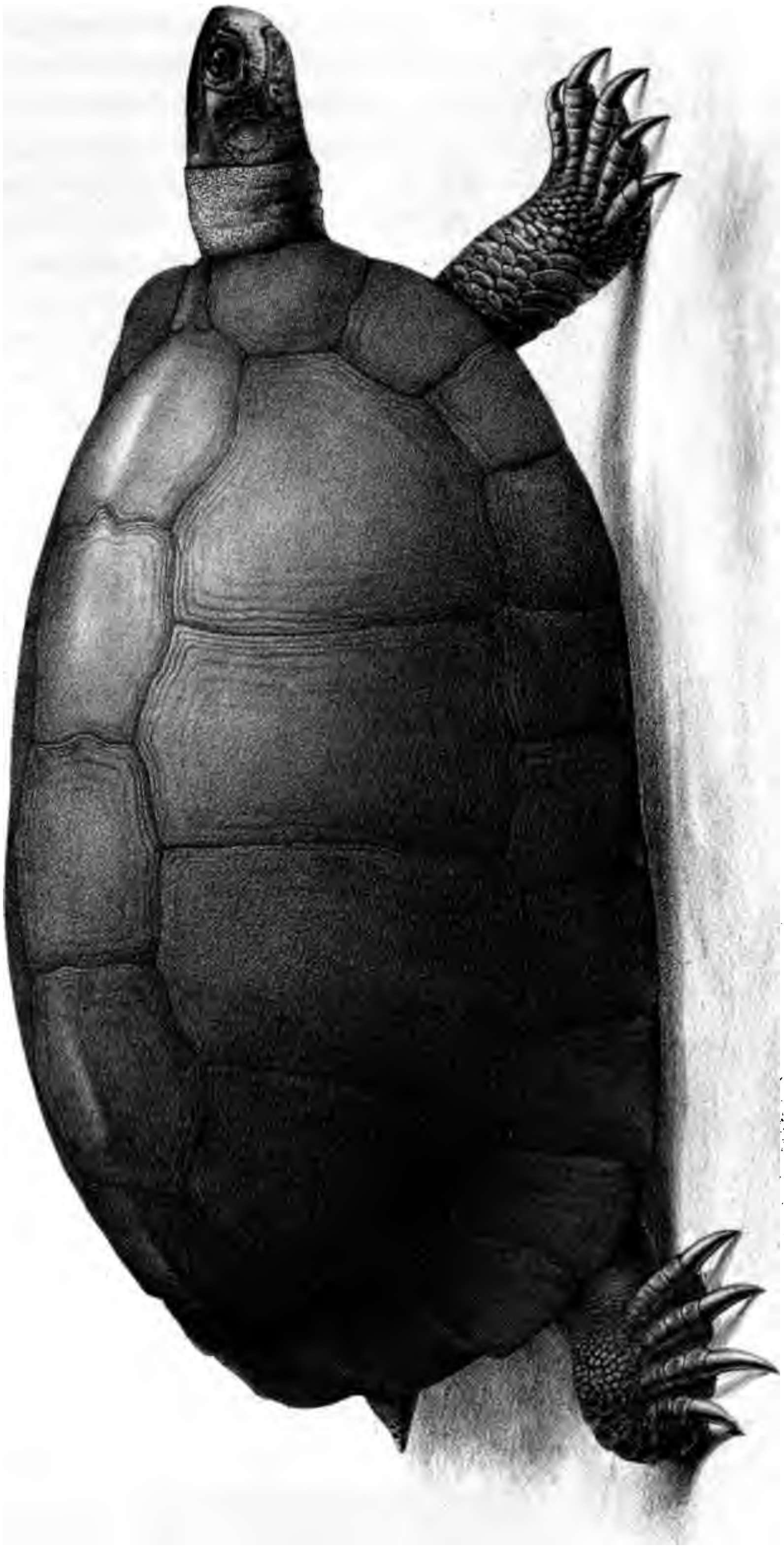
PLATE VII.



CYCLEMYS ANNANDALII, YOUNG. (⅔ NAT. SIZE).

J. Green del. et lith.

Mintern Bros. imp.



CYCLEMYS ANNANDALII (⅖ NAT. SIZE).

J. Green del. et lith.

Mintern Bros. imp.

lobe, and connected with the carapace by a distinct bridge, the width of which is contained twice-and-a-half in the length of the plastron; axillary and inguinal shields large, the suture between the pectoral shield and the marginals longer than that between the abdominal and the marginals, the suture between the pectoral shields as long as or a little shorter than that between the abdominals, the suture between the humeral shields shorter than that between the gulars, and that between the anals shorter than that between the femorals. Hook of the upper jaw bicuspid. Digits extensively webbed, claws long, curved, sharp. Front part of the jaw with broad, band-like transverse shields. Carapace dark brown, spotted with black in the young, plastron and lower surface of marginal shields yellowish, with symmetrical dark-brown markings in the young. Head and upper surface of the neck dark-brown; a yellowish streak on each side of the head, from the upper surface of the snout to the neck, passing above the eye and the tympanum, another, higher up, and parallel with the lower, on the temple, on the neck, lower jaw and edge of upper jaw, yellowish.

Of the two specimens, one (*a*) is newly born, the other (*b*) considerably older.

(*a*) Length of shell, 60 mm.; width, 55 mm.; depth, 28 mm. Shields rugose; an additional shield intercalated between the fourth and fifth vertebrals, and another between the fourth costal and the fifth vertebral. Vertebral keel and edge of marginals yellow; roundish black spots irregularly disposed on the vertebral and costal shields; marginal shields blackish above, speckled with lighter in their proximal third. Plastron with a complicated dark pattern with rounded outlines, between which are dark vermiculations; similar markings cover the bridge and the greater part of the lower surface of the marginals.

(*b*) Length of shell, 145 mm.; width, 117 mm.; depth, 67 mm. Shields with concentric grooves and radiating ridges around the rugose portion.

Traces of the symmetrical dark markings of the younger specimen can be observed on the plastron.

B. Description of the Adult Male.

Shell three times as long as deep, once and two-thirds as long as broad; its posterior border much less strongly serrated than in the young; shields nearly smooth, with the vertebral keel merely indicated on the fourth and fifth vertebral shields; second and third vertebral shields as long as broad, about two-thirds the width of the corresponding costals; plastron deeply concave, the relative proportions of the shields as in the young. Upper jaw with two very strong median cusps, and a very distinct denticulation along the whole border. The interdigital web appears to have been less developed than in the young. Tail nearly as long as the head. Shell black, with yellow markings over the marginal shields and on the plastron, the latter forming a broad median band; head blackish, vermiculate with yellowish, but without longitudinal bands.

Length of shell, 380 mm., width, 245 mm., depth, 130 mm.

'Numerous specimens were brought to us at Kampong Jalor by natives, who frequently keep this tortoise in captivity, boring a hole in the posterior margin of the carapace, and tying a string, passed through this, to their house-posts. We were prevented from preserving more than one large specimen by the bulk, and by the difficulty experienced in killing tortoises. The adult appears to be largely terrestrial in habits, but it is probable that the young are aquatic. The species probably attains a bulk considerably greater than that of our adult specimen.'

6. **Cyclemys dhor**, Gray

A young specimen from Kampong Jalor.

7. **Geoemyda spinosa**, Gray

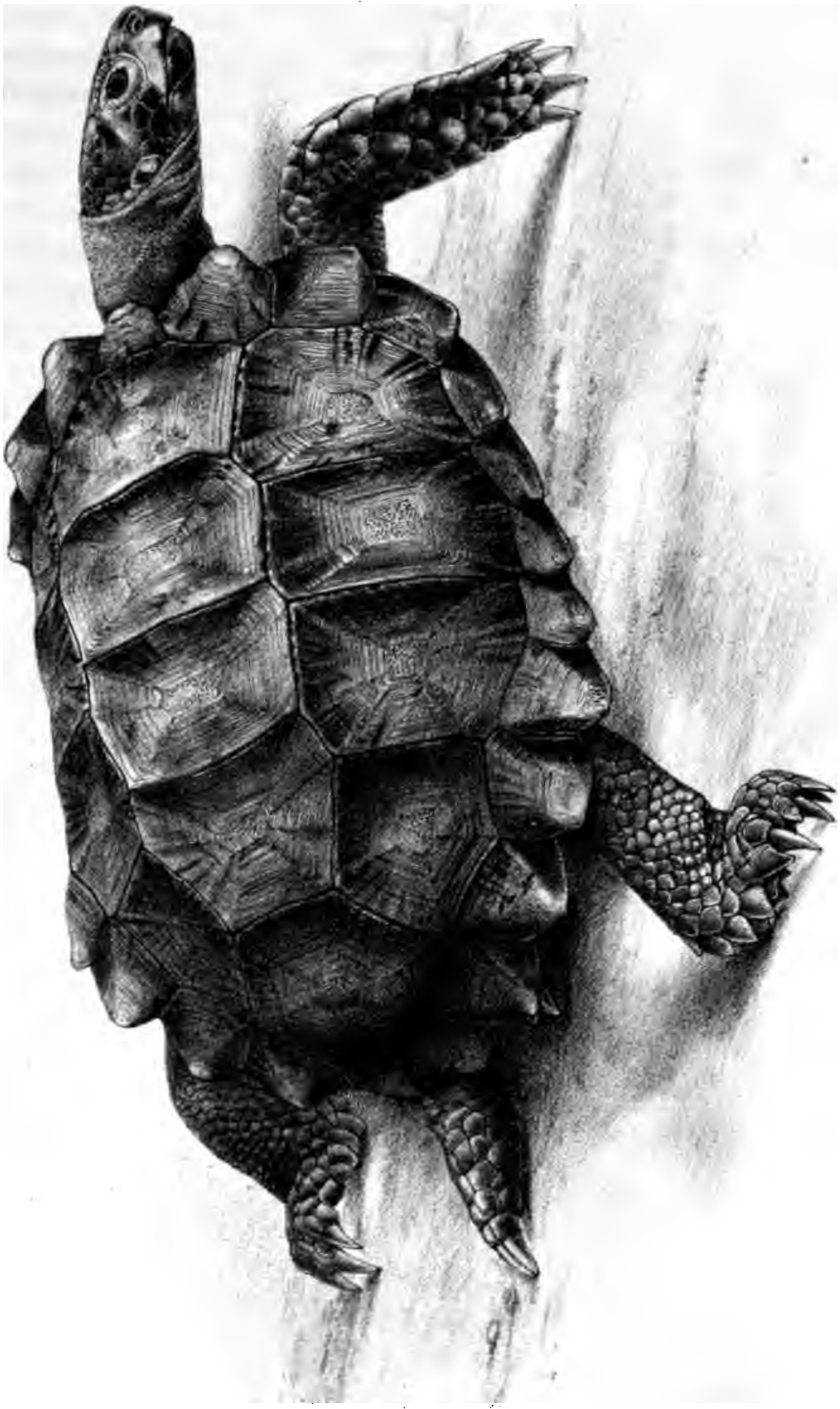
A young specimen from Kampong Jalor, another from the Batang Padang district.

'Common in the flooded rice fields of the Patani States.'

8. **Testudo pseudemys**, sp. nov.

(Pl. IX)

Shell much depressed, its depth one-third to two-fifths its length; anterior and posterior margins reverted and strongly serrated; nuchal shield present, rather large, broader than long; supracaudal shields two, embracing a deep notch; discal shields concentrically striated and more or less concave; vertebrals much broader than long, at least as broad as the costals, the second, third, and fourth, with the antero-lateral side not half as long as the postero-lateral. Plastron large, gular region more or less produced and notched, hind lobe deeply notched; width of the bridge one-third to two-fifths the length of the plastron; pectoral shields meeting on the median line, the suture between them measuring one-seventh to one-third the length of that between the humerals; axillery shield very small, inguinal large. Head rather small; temporal arch narrow, slender, its width not more than one-fifth the diameter of the orbit; two large praefrontal shields and a large frontal; jaws not hooked, not denticulate, the alveolar surface of the upper jaw with a feeble median ridge. Limbs with very large bony, imbricate tubercles, some of



TESTUDO PSEUDEMYS. ($\frac{1}{2}$ NAT. SIZE).

th.

Mintern Bros. imp.

which, on the front of the fore limb and on the heel, are pointed and spine-like; a group of bony tubercles on the back of the thigh, the central ones very large and conical. Tail of male ending in a divided, claw-like bony tubercle. Yellowish or pale brown, dark brown or blackish on the periphery of the dorsal shields and on the anterior border of the marginals; young with the carapace speckled with blackish; plastron yellow or brown and yellow; head and limbs yellow, more or less variegated with dark brown.

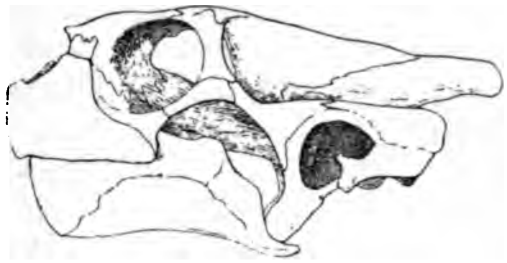


FIG. 1. Skull of *Testudo pseudemys*. Two-thirds natural size.

These tortoises agree in colour and general appearance with the shell from Siam described by Dr. GUNTHER as *Geoemyda impressa*, but they differ from it, as well as from all specimens of *Testudo emys* examined by me, in having the antelateral side of the vertebral shields so much shorter than the postero-lateral. The skull of *Geoemyda impressa* is unknown, but that of *Testudo emys* and that of *Testudo phayrii* differ from that of *Testudo pseudemys* in the much wider temporal arch, as may be seen by the annexed figure, taken from a specimen from Sarawak.

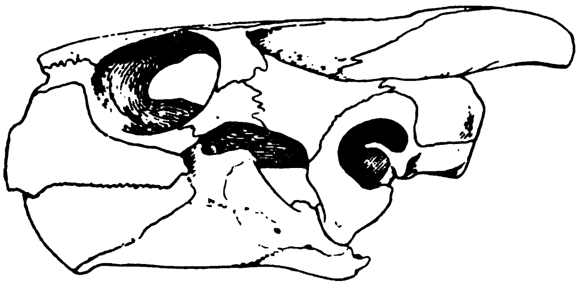


FIG. 2. Skull of *Testudo emys*. Two-thirds natural size.

Two specimens, from the Batang Padang district, South Perak (1,000 feet to 2,000 feet), in the collection, the shell of the larger measuring 255 mm., that of the other 100 mm. I have besides examined a specimen from the Larut Hills, Perak (4,000 feet altitude), obtained by Mr. A. L. BUTLER in 1900, and a young specimen from Thao, Kasia Hills (3,200 feet to 4,500 feet), collected by the late Mr. L. Fea, and which I first referred to *Testudo emys*.[1]

I have lately examined a rather large number of specimens of *Testudo emys*, from the Malay Peninsula and from Borneo, and doubts, similar to those expressed by Dr. von Lidth de Jeude,[2] have arisen in my mind as to the specific identity of *Testudo phayrii* and *Geoemyda impressa*. The type of the former having been carefully figured by Anderson,[3] and the skull of its co-type by Gray,[4] it is possible to form a correct idea of the specimens with which to compare the new material. Both the tortoises brought home by Messrs. Annandale and Robinson agree with *Testudo phayrii* in the shape and proportions of the plastral shields, and in having the nuchal shield much wider than long, but the carapace is more flattened, more of the lateral marginal shields being visible when the shell is viewed from above, and the second and third vertebral shields have a different shape, their antero-lateral borders being much shorter than the postero-lateral. The greater depression might be merely due to age, the type of Blyth's species measuring 510 mm. in shell-length. As to the second differential character, it appears to me to be of specific importance, and, coupled with the difference in the temporal arch, suffices to separate *T. pseudemys*.

In all the specimens,[5] four in number, which agree with *T. emys* in having the pectoral shields of plastron more or less widely separated from each other, the antero-lateral border of the second and third vertebral shields is as long as the postero-lateral, or but slightly shorter ; this is quite irrespective of the great difference in shape which these shields undergo with age, the shells at my disposal varying from 120 to 480 mm. in length. With one exception (the type of *Manouria fusca*, Gray, from Penang), all these specimens have the nuchal shields as long as broad, or longer than broad.

Judging from the figure given by Gray, the skull of *T. phayrii* is identical with that of *T. emys* ; and as the extent of the pectoral shields is a character subject to considerable variations according to Anderson, whose figures show a gradual passage between the two extreme types, I think it best to provisionally maintain the species *T. emys* in the sense in which I have taken it in the *Catalogue of Chelonians* published in 1889.

'The two specimens of *Testudo pseudemys* were taken on a jungle path at dusk, within a few yards of one another. When alarmed they drew in their heads, but when lifted from the ground became very vicious, hissing, stretching out their necks and attempting vigorously to bite, their whole demeanour differing from that of specimens of *T. emys* I have seen in captivity in the Malay Peninsula.'

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[1] *Ann. Mus. Genova* (2) xiii, 1893, p. 312.

[2] *Notes Leyd. Mus.* xvii, 1895, p. 197.

[3] *Proc. Zool. Soc.*, 1871, p. 426.

[4] *Proc. Zool. Soc.*, 1869, p. 470 (*Scapia falconeri*).

[5] Mostly from Borneo ; three from Penang, two from the Larut Hills, Perak.

9. **Testudo elongata**, Blyth

Kampong Jalor.

'Several specimens were brought us by natives at Kampong Jalor, and they said it was common among the granite rocks of a hill in the neighbourhood, named Bukit Bubu (Bald Hill), never being found in the vicinity of water. They called it *kura-kura*[1] *mas*, or 'gold tortoise,' because of the bright yellow colour of parts of the shell. In life the soft parts are of a pallid and slightly yellowish flesh-colour, and in all the specimens we saw, the nose was pink and inflamed, owing to the head and neck having been used as a lever to right the animal when it had been turned on its back.'

CHELONIDAE

10. **Chelone mydas**, L.

11. **Chelone imbricata**, L.

Both the green turtle and the hawksbill occur at the mouth of the Patani River. 'Their eggs, a perquisite of the Malay raja, are collected in enormous numbers, both on Cape Patani and more especially on certain small islands off the coast, a little to the north; but it is difficult to know what the turtles feed upon here, as the sea in these parts is almost devoid of sea-grass and large algae.'

EMYDOSAURIA

CROCODILIDAE

12. **Tomistoma borneensis**, Schlg. & Müll.

A gavial-like crocodilian was observed by Mr. ROBINSON, lying on a log in the Sungkei River, between Jeram Kawan and Sungkei, South Perak.

13. **Crocodilus porosus**, Schn.

Jambu, Jhering.

'The distribution of this crocodile in the Patani States is somewhat local, probably because it needs muddy banks on which to sun itself. It is abundant on the Jambu River, which is little more than a tidal creek, the larger specimens, as a rule, staying some distance up stream, but occasionally descending to the sea. On the lower reaches of the Patani River it is scarce, and the species which is abundant above Bendang Stah is very probably *C. palustris*; it occurs on the islands of the Taleh Sap and in the Lampam River, for a Siamese crocodile hunter at Lampam showed me a number of skulls, all of which appeared to be those of *C. porosus*. He told me, however, that about one individual in every hundred he killed had a very long nose, with a lump at the end, that is to say, probably, was a specimen of *Tomistoma borneenis*.

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[1] *Kuru-kura* is their general name for tortoises, but the large species of Cyclemys are called *lelagu*, while land tortoises are known as *baning*, and the Trionychidae as *labi-labi*. N. A.

LACERTILIA

GECKONIDAE

14. Gymnodactylus marmoratus, Kuhl.

Bukit Besar. 2,500 feet.

'Not uncommon on tree-trunks in the jungle. When disturbed it frequently runs down to the ground, and takes refuge in one of the rats' holes common at the roots of trees.'

15. Gymnodactylus pulchellus, Gray

Bukit Besar, 2,500 feet, and Goah Tanah (Earth Cave), near Biserat.

'The specimen from Bukit Besar was obtained from a hole in the trunk of a dying palm, about thirty feet above the ground. Those from the Jalor cave were found crawling on the sides and floor in absolute darkness; there are specimens, taken in a similar habitat in Selangor, both in the State Museum at Kuala Lumpur and in the Raffles Museum at Singapore.'

16. Gonatodes affinis, Stol.

Bukit Besar. 2,500 feet.

'Dorsal surface dull grey, mottled with black and closely banded with yellow; mid-dorsal line slightly paler yellow; a large black spot, with a bright yellow "eye" in the centre, and bordered posteriorly with the same shade, just behind the base of the fore limbs, these markings being far more conspicuous in the male than in the female; three faint yellowish lateral bars.'

'Common on tree-trunks in the jungle, especially on the one on which the frog *Ixalus horridus* was taken. The gecko was generally found between the upper part of the buttresses of this tree, but when it was disturbed it slipped down into the water in the cavities, beneath the surface of which it remained for some minutes, finally pushing out its head at one side so carefully that not the slightest commotion was caused. The roughness of its integument caused it to be covered with a film of air while beneath the surface of the water, but it is doubtful whether this was anything but adventitious. Besides these geckos and frogs, and also snakes, the pools in the cavities were inhabited by numerous insects—Hemiptera and larval Diptera, Beetles and Odonata.'

17. **Hemidactylus frenatus**, D. & B.

Patani ; Gedong and Tapah, South Perak ; Kuala Lumpur, Selangor.

18. **Hemidactylus platurus**, Schn.

Patani ; Bukit Besar.

19. **Gehyra mutilata**, Wiegm.

Bidor, South Perak.

'The three preceding species are all common in houses, both in the Patani States and in Perak. They all exhibit considerable power of colour change, becoming at night, under the influence of strong light reflected from whitewashed walls, of a peculiar translucent pale yellowish brown. If, however, they run across any dark object on the walls, they immediately become darker.'

20. **Gehyra butleri**, Blgr.

Kuala Lumpur.

Described in 1901[1] from three specimens obtained by Mr. A. L. BUTLER, at Kuala Lumpur, the largest measuring 32 mm. from snout to vent. The specimen brought home by Mr. ROBINSON measures 35 mm. from snout to vent, and has six lamellae under the inner toe, and eight under the fourth. Reddish above, speckled with brown and with yellow dark-edged ocelli, theos ocelli closely approximating in pairs on the tail.

'I obtained several specimens of this species in Selangor, which, so far as my observation goes, is rarely found in houses. All my specimens were captured among the fibre at the base of the leaves of cocoanut palms, where they seem to feed largely on the small centipedes and millipedes found in such situations.' H.C.R.

21. **Gecko verticillatus**, Laur.

Jalor.

'This species is common on the trunks of cocoanut palms in the Patani States, but does not live in the houses either in this district or in Senggora, where there are many large brick and plaster buildings, as it does in Bangkok,[1] where I have seen it commonly in European dwellings. It appears to have no power of colour change.'

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[1] *Journ. Bombay N. H. Soc.* XIII, p. 333, Pl. —, Fig. 1.

22. **Gecko stentor,** Cant.

Batang Padang.

'Though somewhat scarce in collections, this gecko is really common in the Malay jungle, especially in Upper Perak and the adjacent parts of Rhaman, where I heard its characteristic cry almost continuously. It is usually a jungle species, frequenting the upper branches of high trees, but a large specimen, now in the State Museum at Taiping, Perak, was taken in a hospital (built at the edge of the jungle), in the walls of which its cry had disturbed the patients for some time. Our specimens were shot on trees by the Sakais, with their blow-guns ; they consider its flesh a delicacy. The changes of colour undergone by the individuals of this species are very slight, being confined to a slight paling or darkening.

'The characteristic note of this large gecko is often heard in certain bungalows in Kuala Lumpur.' H.C.R.

23. **Gecko monarchus,** D. & B.

Bidor, South Perak ; Kuala Lumpur, Selangor.

'The species appears to be somewhat particular as to its environment, occurring abundantly on the walls and ceilings of some houses, but avoiding others close to them. It has very little power of colour change.'

24. **Ptychozoon homalocephalum,** Gray

Two newly hatched young, from eggs obtained on Bukit Besar.

'The eggs, of which several sets, hatched and otherwise, were noted on Bukit Besar, are deposited in pairs, on the lower surface of leaves or on tree-trunks, sometimes quite near the ground. They have brittle calcareous shells, but must be soft when laid, as they are flattened where they come in contact with one another, the outline of the two together forming a figure of eight, and as the lower surface, which is also flattened, retains an impression of the surface to which it clings and on which the eggs have been laid. The eggs measure about 13 mm. in diameter, and 11 mm. in depth. The period of incubation is long for so small an animal ; in the case of the eggs of a captive specimen

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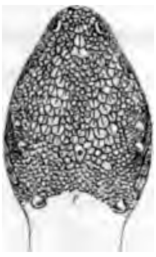
[1] Cf. S. Flower, *P.Z.S.* 1899, p. 632.



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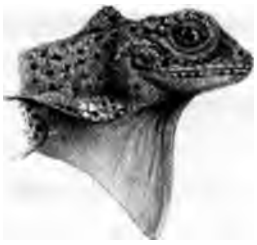

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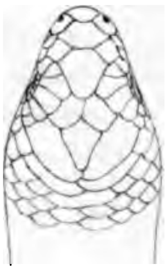

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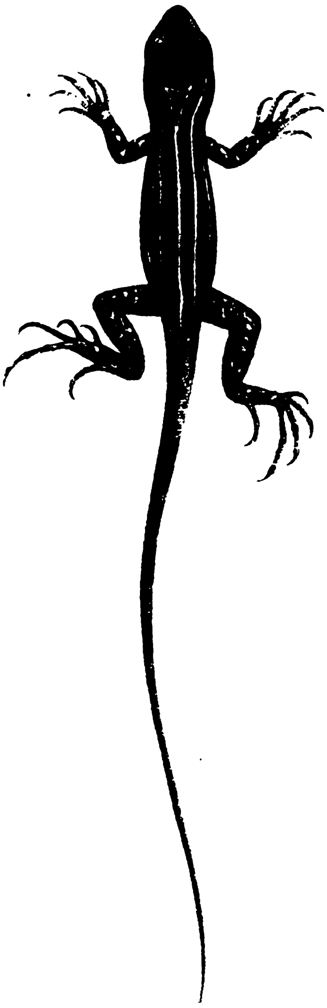

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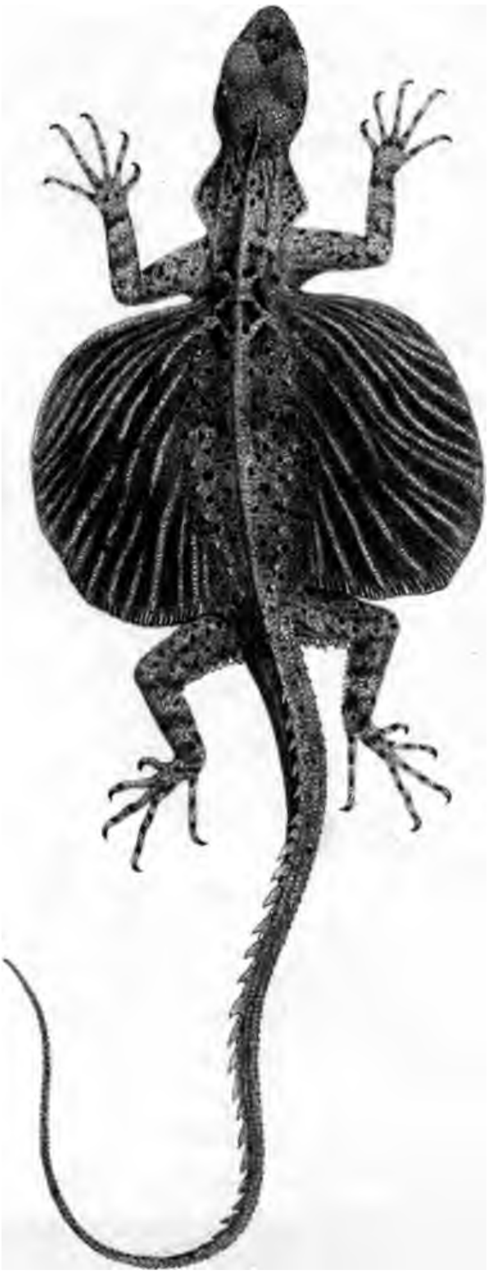

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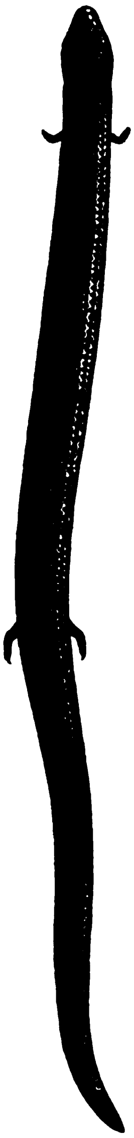

3.

J. Green del. et lith.

Mintern Bros. imp.

1.DRACO PUNCTATUS. 2.LIOLEPIS BELLII.
3.LYGOSOMA MIODACTYLUM.

in Java, F. H. Bauer[1] found that it lasted from November to May; specimens obtained by ourselves in May, in which the embryos were already far advanced, hatched a month later, and we found others, some advanced and some in an early stage of development, in September, When the young geckos emerged they were covered with a delicate membrane, which they cast immediately, rubbing it off against sticks and pulling it from the hind limbs with their mouths, and then devouring it. One specimen was kept alive for about a fortnight, during which it evinced not the slightest tendency to make use of the fold of skin along its side as a parachute. Indeed, this fold, except when accidentally displaced by coming in contact with some foreign substance, was always kept closely tucked round the body, so that it was hardly apparent. The young gecko, which was coloured so as to exactly resemble the bark of a tree, was slightly darker by night than by day, a white bar across the tail becoming more conspicuous in the evening ; otherwise the colour changed very little.'

AGAMIDAE

25. Draco fimbriatus, Kuhl.

Sungkei, South Perak, and Semangko Pass (2,700 feet), Selangor-Pahang boundary.

'General colour above greyish, brown on head and neck, with irregular spots of black, tail banded with blackish brown and clay colour ; lower surface of body uniform dirty grey, chin dusky grey, spotted with black and white on jaws, gular pouch salmon pink, lateral folds more orange.'

28. Draco punctatus, Blgr.

(Pl. X, fig. 1)

Head rather large ; snout as long as the diameter of the orbit ; nostril lateral, directed upwards ; tympanum naked, nearly as large as the eye-opening. Upper head-scales small, keeled ; a distinct Λ-shaped series of enlarged scales on the forehead ; a conical, spine-like tubercle at the posterior corner of the orbit and another in front of it ; ten upper labials. The male's gular appendage hardly as long as the head. A short and strong denticulate nuchal fold. Dorsal scales a little smaller than ventrals, feebly keeled ; a lateral series of enlarged scales. The fore limb stretched forwards extends a little beyond the tip of the snout ; the adpressed hind limb barely reaches the axil. Tail with a very strong crest of long pointed scales. 'Greyish above, tinged with rusty on the crown and on the middle line of the back, with numerous small black spots ; four large dark blotches forming a cross between the shoulders ; alar membrane blackish above, streaked with whitish, uniform whitish beneath ; lower parts bluish, throat and breast with small blackish spots ; gular appendage and inner side of lateral wattles bright chrome-yellow.'

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[1] Gadow's *Amphibia and Reptiles*, p. 512

Total length, 230 mm. ; head, 17 mm. ; width of head, 12 mm. ; body, 67 mm. ; fore limb, 37 mm. ; hind limb, 43 mm. ; tail, 145 mm.'

This species was known from one specimen from the Larut Hills, Perak, and a second from Sarawak.

A single male was obtained on Bukit Besar, 2,500 feet ; shot on a tree in the clearing.

Draco punctatus is most nearly related to the Bornean *D. cristatellus*, GTHR., from which it differs in the stronger caudal crest, in the presence of a dorso-lateral series of enlarged scales, in the shorter gular appendage, in the rather larger upper head-scales, and in the perfectly lateral nostril.

27. **Draco melanopogon**, Blgr.

Bukit Besar. 2,500 feet.

This species is now known to have a wide distribution, as it has been recorded from various localities in the Malay Peninsula (Malacca, Singapore, Ulu Selama, Bukit Besar) and from Borneo, Sumatra, and the Natuna Islands.

The specimens from Bukit Besar (males) are described as having in life the dorsal surface moss-green and black, the ventral surface cream, marked with dark brown ; gular pouch black and white ; alar membrane black, spotted with golden yellow.

28. **Draco formosus**, Blgr.

Bukit Besar, 2,500 feet ; and Patang Padang, South Perak.

'Sides of throat deep claret-colour ; upper surface of alar membranes pale gamboge, with five irregular bars of blackish mottling, becoming claret-colour towards the outer edge ; a broad subterminal zone of paler claret and dull yellow mottled with black.'

'A pair of this species, probably a male and female, sailed into our clearing from the jungle and alighted on a large tree-trunk on several occasions, generally towards evening. The last to alight was once or twice secured, but the first always escaped. If unmolested, the former chased the latter up the tree in a spiral course, until they disappeared among the branches.

'The common *D. volans* has the same habit, and in its case it is easy to distinguish the sexes by the colour of their gular appendages. *D. volans*, of which we did not obtain a specimen, is somewhat sporadically distributed in the Patani States, occurring in fair numbers on the trunks of the cocoanut and betel palms in some villages, while apparently absent from others. When seated on the trunks of these trees, however, its coloration and the immovability of its pose render it practically invisible. On the coast of Trang it is very abundant in the villages, as it is in many parts of Perak—though we did not happen to see it in that state—and Selangor, as well as in Singapore and Penang.'

29. **Draco blanfordii**, Blgr.

Bukit Besar. 2,500 feet.

30. **Gonyocephalus borneensis**, Schlg.

Semangko Pass, Selangor-Pahang border. 2,700 feet.

'I took the specimen representing this species; it was seated on a chair in the Government Resthouse, on the Semangko Pass, and was very sluggish. I have noticed the same sluggishness in the case of the North Australian *G. boydi.* Young individuals were not uncommon in the neighbourhood, and were exceedingly active and difficult to capture.' H. C. R.

31. **Gonyocephalus herveyi**, Blgr.

Batang Padang, South Perak.

32. **Gonyocephalus grandis**, Gray

Batang Padang, South Perak.

'The specimens in our collection of this and the preceding species were shot by the Sakais with their blowguns. For one of them we are indebted to Mr. G. B. CERRUTI, late Superintendent of Sakais, who also presented us with other zoological specimens from the same district.'

33. **Acanthosaura armata**, Gray

Bukit Besar; 2,500 feet.

'I found the specimen digging for earth worms in a small bare patch in the jungle. It had evidently been successful, as its stomach was full of earth. Apparently only its fore limbs were used in digging. When disturbed it rushed into a hole in a tree trunk. Another specimen was seen on Bukit Besar, clinging to the stem of a sapling. When a hand was stretched out to seize it, it dropped rather than leaped into the undergrowth.

'When first seen, the specimen taken was almost black, with only small blotches of green on the body; there was a distinct division in the coloration a little behind the fore limbs, and in front of this the shade was much duller than it was on the tail and the hind quarters. When the animal was handled, the green blotches began gradually to expand, until, finally, the comparative extent of green and black was completely reversed. This is remarkable as being exactly the opposite of what takes place when *Calotes cristatellus* is roughly treated.'

34. **Calotes cristatellus**, Kuhl.

Jalor, Batang Padang

'This lizard is the most common Agamid in South Perak and Selangor, and though it is, perhaps, less abundant in the Patani States, it is far from being scarce; I have seen specimens in Patalung. Though essentially a brushwood species, it penetrates into high jungle on Bukit Besar. It is rather less active than *C. versicolor*, and often sits quite motionless on tree-trunks, with its head and forequarters raised from the surface to which it clings. It is usually of a bright green colour in life, but if ill-used becomes almost black, the green only remaining in the form of small blotches and veinings, which, however, re-expand if the animal is killed or narcotized.'

35. **Calotes versicolor**, Daud.

Jalor and Batang Padang, South Perak.

'*Calotes versicolor*, the 'chamaeleon' of the Europeans of the Malay Peninsula, is very abundant in the northern parts of the Patani States, in Senggora, on the shores of the Taleh Sap, and also in Upper Perak; but is rare in South Perak. It is an extremely active form, principally found in the neighbourhood of human dwellings. Mr. ROBINSON has watched a specimen seated on a tree trunk, up which a stream of leaf-sewing ants (*Oecophylla smargadina*) were making their way to their nest. It devoured many as they passed, and there is reason to believe that they form an important item in the food of the species. When this lizard is very much excited and in rapid motion, the locomotion becomes, at any rate for short distances, bipedal.[1] I have published an account of the nuptial dance of the Malay 'chamaeleon' elsewhere,[2] which is of interest as showing that the changes of colour which have given the lizard its English name proceed, like those of the true chamaeleon,[1] very largely from a psychological or psychico-physiological stimulus. The same view is illustrated by the fact that dark vertical bars, which are a fairly conspicuous feature in the young at all times, only become apparent in the adult when it is annoyed. My note on *Calotes emma* in Dr. GADOW's *Amphibia and Reptiles* (pp. 518, 519) should refer to this species.'

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[1] Cf. E. Green, N. Annandale, and W. Saville Kent; *Nature*, 1902, vol. lxvi, pp. 492, 577, and 630.

[2] *Proc. Zool. Soc.* 1899, p. 858.

36. Calotes emma, Gray

Bukit Besar and Jalor

'General colour pale sage green ; a broad longitudinal band of dirty white on each side ; irregular transverse markings of sienna brown, becoming darker where they cross the longitudinal band ; dorsal and nuchal crests pale sage green ; lateral surface of head bright green, with a dark bar running backwards from the angle of the eye. Skin and base of scales on gular pouch dark crimson lake ; a triangular sooty pouch immediately in front of fore limbs.

'Jalor is, so far as is known, the southern limit of this species, which is quite common in the interior of Patalung ; but it is a jungle-loving form, and, as such, liable to escape detection. Its powers of colour change are slight, consisting chiefly in an accentuation of the darker markings on annoyance or irritation.'

37. Liolepis bellii, Gray

(Pl. X, Fig. 2.)

Patani and Jalor.

The young from Patani recall, by their livery, the young of various Lacertids of the genera *Acanthodactylus* and *Eremias*. The following notes on their life coloration were taken by the collectors :—'Tail bright brick-red ; median and lateral stripes on body lemon-yellow ; pale yellow spots and faint traces of cross-bars occur between the stripes on the sides. In the adult, the tails become dull grey, and the pale yellow spots and traces of cross-bars increase in size and become orange and purple respectively, more brilliant in the male than the female, while bright blue markings, also more brilliant and more extensive in the male, make their appearance on the ventral surface.

'In the Patani States, and apparently also in Kelantan, Trengganu, and Pahang, *Liolepis bellii* is confined to sandy localities, almost bare of vegetation, between the foot hills and the sea. On the West Coast, it is common on the coast and islands of Trang, and has been recorded from other localities, but want of suitable habitats makes its occurrence sporadic, and renders it generally rare in the south of the Peninsula. I am now certain that it is monogamic, a single pair inhabiting a burrow, which is shared by several young ones, probably hatched in March or April, at least for some weeks. If an individual is surprised away from home, it does not bolt down the nearest burrow, but makes its way to its own, running with the fore part of the body somewhat depressed and the tail raised high in the air. Within the mouth of its burrow it often turns to view the cause of its disturbance, before disappearing. Mr. LAIDLAW has found vegetable matter in the stomach of specimens from Trengganu,[1] but the ordinary food of the species consists largely of the small Acridiids common in the localities it frequents. A specimen was taken by Mr. ROBINSON climbing a tree-trunk at Sai Kau; but this is a most unusual position.

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[1] Poulton, *The Colours of Animals*, pp. 84 and 90.

'I have already commented upon the purple and orange cross-bars on the sides of this species at some length;[2] but I may add, that when the males are fighting they make themselves as flat as possible, thus, incidentally, displaying the brilliant coloration on their sides. They stand facing one another, with the forequarters and head raised as high as possible, and each tries to slip past his adversary's guard and seize him by the shoulder. At last one catches the other with his jaw, either on the shoulder or the snout, and commences to worry him. If the individual so seized can shake himself free, he bolts. The victor does not pursue, but stands with uplifted head, which he bows repeatedly in the direction of his adversary's flight, for some minutes, and then makes off in the opposite direction.

'The brilliant coloration of the young of this lizard affords a good instance of a phenomenon which has not received the attention it merits among students of animal coloration, I mean the fact that young reptiles are very often more brilliantly or more conspicuously coloured than adults of the same species. To give other examples from species actually collected by Mr. ROBINSON and myself in the Malay Peninsula, the young of *Cyclemys annandalii* has yellow streaks on the head, as well as markings on the carapace, which disappear in the adult; the young of *Crocodilus porosus* and *Varanus salvator* exhibit greater contrasts of colour on their dorsal surface than do the adults; many Malay Scincidae (*e.g.*, *Mabuia multifasciata*) have longitudinal pale stripes on the dorsal surface of the young that become broken up into inconspicuous spots or blotches, or altogether disappear, in the adults; the young of the snake *Hypsirhina bocourtii* are marked with black and yellow where the adult only displays different shades of inconspicuous brown ; the dorsal cross-bars of black or dark green on several of the Hydrophinae disappear with age, leaving an almost uniform dull green or grey coloration. These are only a few instances, taken from a comparatively small number of species from a very limited area ; but, even from them, it is clear that the young of reptiles lose their characteristic juvenile coloration in one of two ways, either by the fading of brilliant or intense colours, or by the growth of dark pigment, which encroaches upon pale areas, either obliterating them altogether or breaking them up in such a way that they are no longer conspicuous. In some genera the conspicuous coloration persists, in a more or less marked way, through life in certain species, being confined to the young in others, so that it is more probably a vestigial character than a new development ; for example, the yellow streaks on the head which disappear in the adult of *Cyclemys annandalii*, normally persist through life in *C. amboinensis*, while the lateral bars in *Calotes versicolor* are only occasionally visible in this species in the adult (when it is in a state of irritation), generally present in the young, and at any rate closely paralleled in the adult of *C. emma* even when the animal is undisturbed. Of course, sexual coloration, such as the cross-bars on the sides of *Liolepis bellii*, has no connexion with this phenomenon of the juvenile livery, and, equally of course, there are many reptiles which retain a conspicuous or intense coloration, however old they may be, and others which develop such a coloration after their extreme youth is past, for reasons possibly other than sexual. Among Batrachians, conspicuous coloration is rare in youth ; frogs and toads endowed with bright pigment, like *Ixalus horridus*, do not possess it when first they lose their tails, though its extent in later development may be indicated, while almost adult specimens of *Ichthyophis glutinosus*, which I have seen alive in a stream in the Malay Peninsula, have had both the yellow and the black of their characteristic coloration less intense than was the case with larger individuals.'

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[1] *Proc. Zool. Soc.* 1900, p. 309.

[2] *Proc. Zool. Soc.*, 1900, pp. 857, 858.

VARANIDAE

38. **Varanus nebulosus,** D. & B.

Jalor, and Batang Padang, South Perak.

39. **Veranus salvator,** Laur.

Jalor.

'On the coast of the Patani States both *Varanus nebulosus* and *V. salvator* are very common, especially on the mud-flats near Jambu, where they stalk the mangrove crabs and the different "mudhoppers" (*Periophthalmus*, *Boleophthalmus*, and the like), which bask in the sun in such localities. About Biserat and Kampong Jalor, *Varanus nebulosus* is the commoner of the two near the villages ; but *V. salvator* is abundant on the limestone hills and in the pools at their base. In the interior of Rhaman and Kelantan, the former species is comparatively rare. Neither species, as a rule, penetrates into deep jungle, where their place is taken by *V. rudicollis* and other scarcer species. In the sheltered waters of Patani Bay, *V. salvator* may occasionally be seen swimming in the sea. It seems to find water more necessary than *V. nebulosus*, which, on the other hand, is more frequently observed on tree-trunks and branches, though both are aquatic and arboreal on occasion. The food of both species includes almost every kind of small animal and carrion. The yellowish markings of the dorsal surface of *V. salvator* are more brilliant and conspicuous in the young than in the adult.'

LACERTIDAE

40. **Tachydromus sexlineatus** Daud.

Biserat, Jalor

'I have only seen this species in the neighbourhood of Biserat (the one recorded locality in the Malay Peninsula), where it lives among long grass, along the top of which the great length of its tail and the slenderness of its body permit it to run without bending the blades. In life, its tail is very brittle.'

SCINCIDAE

41. **Mabuia macularia**, Blyth.

Biserat, Jalor.

42. **Mabuia rugifera**, Stol.

Muar River, Selangor

43. **Mabuia multifasciata**, Kuhl.

Jalor, Bukit Besar, Batang Padang (South Perak), and Selangor.

'Probably the common skink of all cultivated parts of the Malay Peninsula.'

44. **Mabuia siamensis**, Gthr.

Jalor.

This is an addition to the herpetological fauna of the Malay Peninsula, the species being previously known from Southern China and Siam.

45. **Lygosoma praesigne**, Blgr.

Semangko Pass, Selangor-Pahang border.

The single specimen agrees very closely in size, scaling, and coloration, with the type from the Larut Hills, altitude, 4,000 feet, which I described in the *Annals and Magazine of Natural History* (7) vi, 1900, p. 191.

'The specimen was captured in a crevice in a tree-trunk, and many others were noted in the vicinity, which I neglected to secure, mistaking them for the immature stage of the common *Mabuia multifasciata*, to which *L. praesigne* bears a strong superficial resemblance.' H. C. R.

46. **Lygosoma bowringii**, Stwr.

Jambu, Jhering.

'The specimen was taken at dusk, on a sandy path. It progressed, rather slowly, by movements of the body, the limbs giving, apparently, very little aid.'

47. **Lygosoma quadrivittatum**, Ptrs.

Bukit Besar.

This skink was known from Celebes (Gorontalo) and the Philippines (Mindanaor); the British Museum has received it from Sandakan, North Borneo; and its range is now found to extend to the Malay Peninsula.

48. **Lygosoma chalcides**, L.

Batang Padang, South Perak.

'The limbs of this and similar slender forms are of more use in progression than their small size would indicate, at any rate upon the surface of the ground. The species are, however, burrowing forms, so often found associated with the Typhlopidae that the Malays regard them as the larvae of these snakes.'

49. **Lygosoma miodactylum**, sp. nov.

(Plate X, Fig. 3)

Section *Lygosoma*. Body much elongated, limbs minute, the anterior with toes rudimentary, bud-like digits with blunt claws; the posterior terminating in a single sharp claw. Snout short, obtuse; lower eyelids scaly, nostril pierced in the anterior lower part of the nasal; no supranasal; fronto-nasal twice as broad as long, forming sutures with the rostral and with the frontal;

praefrontals small; frontal slightly longer than broad, broader than the supra-ocular region, in contact with the first and second supraoculars; four supra-oculars, six superciliaries; fronto-parietals distinct; interparietal longer than the fronto-parietals; parietals forming a suture behind the interparietal; first upper labials largest, fourth entering the orbit; ear completely hidden; twenty-two smooth scales round the middle of the body, equal; a pair of enlarged praeanals; tail thick, dark-brown above, white beneath, sides white with longitudinal series of brown spots corresponding to the scales.

Total length, 152 mm.; head, 11 mm.; width of head, 7 mm.; fore limb, 4 mm.; hind limb, 6 mm.; tail (regenerated), 65 mm.

A single specimen from Semangko Pass, Selangor-Pahang boundary. 2,700 feet.

Very closely allied to *L. larutense*, Blgr.,[1] from Larut, Perak (3,000 to 4,000 feet). Distinguished by the monodactyle hind limb, and the smaller number of scales round the body, viz., twenty-two instead of twenty-six.

DIBAMIDAE

50. **Dibamus novae-guineae**, D. & B.

An embryo from Bukit Besar.

New to the Malay Peninsula. Known from New Guinea, the Moluccas, Lombok, Celebes, Sumatra, and the Nicobars.

'The egg, which was found by a native in a dead tree-trunk, was broad in proportion to its length, but not circular; it had a brittle and highly calcareous shell.'

OPHIDIA

TYPHLOPIDAE

51. **Typhlops braminus**, Daud.

Bukit Besar and Selangor.

52. **Typhlops nigroalbus**, D. & B.

Bukit Besar, Sai Kau, and Jalor.

'The distribution of the Typhlopidae in the State of Jalor is somewhat sporadic, but appears to coincide with that of burrowing lizards, such as *Lygosoma chalcides*, and of the burrowing Amphibian, *Ichthophys glutinosus*. For instance, these forms are exceedingly rare, if they occur at all, in the immediate vicinity of Biserat; while they are all abundant at the villages of Mata Rusa and Parang, which are four or five miles distant across the rice fields, and which stand in large and ancient orchards. The Malays, who delight in zoological theorizing, say that the "earth snakes" avoid the banks of the river because they are afraid of some particular ant, which is abundant there. This theory may be the correct one, but to myself, who have not had the opportunities of observation enjoyed by the natives, it seems more probably that they avoid a sandy soil, in which there are few earthworms, and prefer a rich leaf-mould in which earthworms abound.'

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[1] *Ann. and Mag. N. H.* (7) v, 1900, p. 306.

BOIDAE

53. Python reticulatus, Schn.

Batang Padang and Jalor.

Not uncommon in the Patani States and Lower Siam. The Malays have many superstitions regarding it.[1]

COLUBRIDAE

54. Chrysydrus granulatus, Schn.

Patani.

55. Tropidonotus piscator, Schn.

Jalor.

56. Tropidonotus chrysargus, Schlg.

Bukit Besar and Jalor.

'Two specimens were captured in pools of water in a tree-trunk, feeding on the spawn of the frog *Ixalus horridus*.'

57. Macropisthodon rhodomelas, Boie.

Batang Padang.

58. Lycodon laoensis, Gthr.

Jalor.

Was only known from Siam until discovered at Kota Bharu (Rhaman) by the 'Skeat' Expedition.

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[1] *Fascic. Malay., Anthrop.*, part 1, p. 88. See also Skeat's *Malay Magic*, pp. 302, 303

59. **Zamenis korros**, Schlg.

Jalor.

'A very common snake in Jalor and Nawngchik, generally being found in or near brushwood. The Malays call it the "wild snake" (*ular liar*) on account of its vicious behaviour when captured. At Biserat a native brought us a male and female which he had taken paired. The male, which had evidently lost the tip of his tail, measured 174 cm., and the female 202 cm. in length. Both these specimens had the ventral surface of the neck of a bright chrome yellow, which was more intense in the male than the female. This brilliant colour is usually absent, and is probably assumed only at the breeding season. The large, black-edged scales of the tail of this species give large specimens a rather close resemblance to the Hamadryad (*Naia bungarus*) which has often an orange patch of considerable size on its throat. Consequently, the Malays often confuse the two species, the harmless with the venomous, and call large specimens of the former by the name that properly belongs to the latter.

'A very large specimen, measuring 2,505 mm. in length, was brought us at Kampong Jalor, and was more variegated in coloration than were the smaller specimens commonly seen. Its general colour above was dark fuscous, with mesial and lateral black lines, joined by black cross-bars. The ventral surface was cream, vermiculated with slaty black, the sides of the scales being very dark lead-grey. The tail was almost entirely of the latter shade beneath; above it had a diamond-shaped pattern of black on a dark fuscous ground. The skin between the scales was pale yellow, producing zigzag markings along the sides. This specimen deceived not only the natives of the village, but also ourselves. We were about to start on a journey and merely examined the colour of the specimen, never doubting but that it was one of *Naia bungarus*.'

60. **Coluber taeniurus**, Cope

Goah Tanah, near Biserat, Jalor; and Batu Caves, near Kuala Lumpur, Selangor.

The large specimen from Jalor agrees with the definition of the var. *ridleyi*, BUTLER,[1] whilst the smaller specimen (97 cm.) from the Batu Caves is of a generally darker colour and shews faint traces of a reticulate pattern on the middle part of the body, whilst the dorso-lateral stripe is intensely black on the posterior part of the body and on the tail.

'This snake, which is called by the Malays of Selangor and Patani "moon snake" (*ular bulan*), is not so common in the Jalor caves as in those near Kuala

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[1] *Journ. Bomb. Soc. N. H.* xii, 1899, p. 426.

Lumpur. In both localities its food consists entirely or principally of bats.[1] The sound it produces when disturbed is most peculiar, in no way resembling a hiss, but rather, as I find it described in my notebook, being midway between a mew and a squeal. The snake is usually found in the darkest parts of the cave, but though it seems dazed and purblind when suddenly brought out into a bright light, it soon regains normal vision. The difference between the young specimen and a much larger one, of the *ridleyi* variety, taken the same day as that on which we took the former, and within a few yards of its place of capture, was, perhaps, more marked in life than it would have been in preserved specimens, and the fact that the *ridleyi* variety departs further from the normal coloration of the species, makes it most improbable that the superior intensity of the pigmentation of the smaller individual was merely a juvenile livery. Mr. BOULENGER points out, that no very young specimen of *Coluber taeniurus* has been recorded from the Malay caves, and that it is very possible, on the one hand, that if young specimens were kept in total darkness, they would, so to speak, fade into the variety *ridleyi*, and, on the other, that older specimens of this variety, if kept in daylight, might possibly become darker and assume the typical markings of COPE's species ; and the living specimens we have seen bear out this view. It is strange, however, how extremely rare specimens of *Coluber taeniurus* appear to be in the Malay Peninsula, except in the caves, in some of which they are quite abundant.'

61. Coluber radiatus, Schlg.

Jalor.

'This is the "rat snake" (*ular tikus*) of the Patani Malays, in whose houses it not infrequently takes up its abode, feeding on rats and on the sparrows,[2] which nest in the roofs of the larger buildings.'

62. Dendrophis pictus, Gmel.

Jalor.

'Probably the most abundant snake in the cultivated parts of the Patani States, where it is called *ular lidi*, that is, "midrib of the cocoanut-palm snake," a name the appropriateness of which is realized when one sees a leaf of this palm from below, with the midrib black against the sky, and an apparent light space on either side of it, due to the comparative narrowness of the leaflets where they leave it. The snake is generally found among bushes, often at the edge of rice fields.'

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[1] S. Flower, *Proc. Zool. Soc.* 1899, p. 668

[2] *Passer montanus.*

63. Calamaria pavimentata, D. & B.

Jalor, Sai Kau (Nawngchik), and Batang Padang (South Perak).

The black line along the lower surface of the tail may be absent.

'Not uncommon among the rubbish under native houses in the Patani States, where small specimens are sometimes called *ular lima kendiri*, "five *kendiri* snakes," a *kendiri* being three cents, or considerably less than a penny. This curious name is given them because it is believed that the effects of their bite can be remedied for medicine worth fifteen cents.'

64. Hypsirhina plumbea, Boie.

Jalor.

'Essentially aquatic, but often found under dead trees some distance from water. On Cape Patani it is common in the freshwater pools, on the bottom of which it may often be seen, lying stretched out almost straight.'

65. Hypsirhina bocourtii, Jan.

Jalor.

'Often found with *Acrochordus javanicus* in swamps and pools. The superior brilliance of coloration of young specimens is remarkable.'

66. Dipsadormorphus dendrophilus, Boie.

Jalor.

The specimens belong to the var. *melanotus* of BLEEKER.

'This nocturnal snake is very vicious, and drums with its tail on the ground when alarmed, but its food consists of small mammals, frogs, lizards, other snakes, fish, and, curiously enough, slugs.'[1]

67. Dipsadomorphus cynodon, Boie.

Jalor.

'The specimen was taken coiled up on a bush about four feet above the ground. Unlike all the specimens of *D. dendrophilus* which I have seen in life, it was sluggish in demeanour, and made little attempt to escape, though it had evidently not had a recent meal.'

68. Dipsadomorphus pallidus, sp. nov.

Anterior palatine and mandibular teeth enlarged, but less than in *D. cynodon*. Rostral broader than deep, well visible from above, internasals broader than long, shorter than the praefrontals ; frontal as long as broad, as long as the distance from the end of the snout, shorter than parietals ; loreal tapezoid, longer than deep ; one praeocular, in contact with the frontal ; two postoculars, in contact with the frontal ; temporals 2 + 3 ; eight upper labials, third, fourth, and fifth entering the eye ; four or five lower labials in contact with the anterior chin-shields, which are smaller than the posterior. Scales in twenty-one rows, vertebral row strongly enlarged. Ventrals, 256 mm. ; anal, entire ; subcaudals, 154 mm. Head and neck purplish-grey above, fading into a pale brown on the body ; no spots or markings of any kind ; upper lip and lower parts yellowish-white ; belly and tail speckled with grey. Total length, 1,580 mm. ; tail, 420 mm.

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[1] Cf. *Proc. Zool. Soc.*, 1900, p. 859.

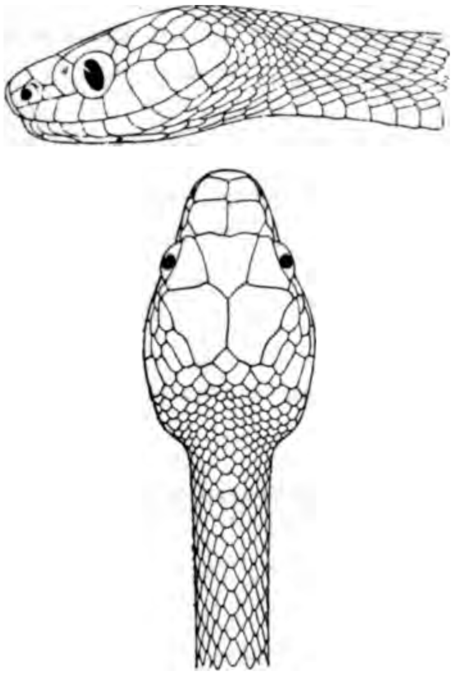

FIG. 3. Head of *Dipsadomorphus pallidus*. Two-thirds natural size.

A single female specimen from Jalor.

69. **Psammodynastes pulverulentus**, Boie.

Jalor.

70. **Dryophis prasinus**, Boie.

Patani, Bukit Besar, and Jalor.

'Common throughout the Patani States, equally so in virgin jungle at 3,000 feet, and in the open casuarina woods on Cape Patani. It feeds chiefly on skinks. On Bukit Besar, we watched a large specimen on the look-out for prey. It had its tail and the posterior half of its body coiled among the branches of a small shrub growing among long grass, while the anterior half of its body stretched outwards without support, the neck being arched. This position was retained for some minutes, and then an abrupt movement changed the direction of the head and neck, without an alteration in the position of the tail and that part of the body coiled in the shrub. The same movement was repeated at intervals, so that the snake viewed all quarters in turn. When annoyed, *D. prasinus* puffs out its slender neck so that it attains a girth approximately equal to that of the body, and by so doing causes the skin to be stretched and the black and blue-grey markings between the scales to be displayed. The three colour-varieties, the commonest of which has in life the general colour of the dorsal surface a bright leaf-green, while the others have it emerald green and golden brown respectively, are found together in the Patani States, and the difference in their appearance does not appear to be due either to age, to sex, or to environment.'

71. Chrysopelea ornata, Shaw

Jalor.

'Also a common species in the Patani States, Senggora, Patalung, and Trang, frequently entering native houses and lodging in the roof. The commonest coloration in these States is blackish, finely chequered and veined with greenish yellow. Individuals thus coloured are called *ular jelôtong* by the Malays of the Patani States, *jelôtong*, the colour of the *lôtong* monkey, *Presbytes* (*Semnopithecus*) *obscurus*, being a dark slaty grey. When a specimen has scarlet and black spots on the sides, it is called *ular batu daching*, or "balance-weight snake," because these spots resemble the little scarlet and black "crabs' eye" seeds, used as weights in the Malay goldsmiths' scales.'

72. Thalassophis annandalii, Laidlaw

Distira annandalii, *Laidlaw*, *P.Z.S.*, 1901, ii, p. 579, pl.xxxv.

Head moderate, body short and stout, strongly compressed behind the neck. Rostral broader than deep; nasals small, separated by a pair of large internasals, which widen in front, upper head shields more or less broken up, the parietals small and separated from each other, and sometimes also from the frontal, by very small scales; frontal and supraocular unusually large, well developed, eye separated from the upper labials by one or two suboculars, one or two prae-, and one or two postoculars; temporal scales small, numerous;

nine to twelve upper labials, chin-shields usually broken up into scales. Scales extremely small, ninety to one hundred round the middle of the body, juxtaposed, dorsals with a more or less distinct central tubercle or short keel. Ventrals, 350-370 mm., very feebly enlarged. Pale greyish olive above, white below; back with dark cross-bars, narrower than the interspaces, tapering to a point on the sides.

Total length, 600 mm.; Tail, 80 mm; Greatest depth of body, 43 mm.

Several specimens from Patani.

This is a very remarkable sea snake, distinguished from all other Hydrophinae by its extremely small scales. As the nasal shields are distinct from the internasals, it is better placed in *Thalassophis* than in *Distira*, if, however, the former deserves to rank as a valid genus.

73. Hydrophis caerulescens, Shaw

Patani.

74. Distira wrayi, Blgr.

Patani.

75. Distira jerdonii, Gray

Patani.

76. Enhydris hardwickii, Gray

Patani.

77. Enhydris valakadien, Boie.

Patani.

'This appears to be by far the commonest species in Patani Bay, in the shallow and muddy waters of which sea snakes literally swarm, while they appear to be very little less common in the open sea on the other side of Cape Patani. A very large proportion of the fish on which they feed in the bay are Silurids and others provided with long, sharp spines, and the manner in which these spines are eliminated from the snakes' bodies is curious, for they appear to pass out through the walls of the alimentary canal and through the body wall to the exterior. I have frequently found specimens of the Hydrophinae with fish spines actually protruding from within through the integument, without, apparently, causing any inflammation or inconvenience. Sea snakes cannot hiss, but produce a low gurgling sound when annoyed. During the fishing season at Patani, in the spring and summer months, they are comparatively harmless, being inoffensive except when injured, and never, it is said, biting men wading in the sea with their nets; but during the north-east monsoon, in November, December, and January, when a tremendous surf breaks all along the shore and practically blocks up the mouths of the rivers, the sea snakes, battered in the waves, often cast up on the beach torn and wounded, naturally lose their temper, and bite anything in contact with which they come. We have seen them in this condition, and can well believe, as we were told, that several deaths are annually caused by their bites among the fishermen of every little community by the sea, who take the opportunity to go out shrimping whenever a break in the weather occurs. It is said, too, that numbers of the snakes are shut up in the river mouth, where they have taken refuge from the storm, and that when in fresh or brackish water their bite is most dangerous. The Malays say that when a person is bitten blood starts out from his eyes and ears, and he dies in high fever within twenty-four hours.'

78. **Naia tripudians**, Merr.

Jalor. Belongs to the var. *fasciata*, Gray.

'The cobra is rare throughout the Patani States, but is said to be more abundant on Cape Patani than elsewhere. We could not hear of a single death from its bite. The only specimen which we saw in nine months, except the specimen preserved, belonged to the same variety, and was brought to us at Sai Kau. A very beautiful variety of an almost uniform yellowish colour, known to the Malays as "turmeric ladle-hood snake" (*ular tedong sendok kunyit*), is, apparently, not very uncommon in Rhaman, where, in 1899, I saw two specimens in one day.'

At Kuala Lumpur, cobras were very common, and numerous specimens were brought to me at the Museum. They belonged without exception to the black variety, *N. sputatrix*, Boie, which is the prevalent form in the southern half of the Peninsula.

79. **Naia bungarus**, Schleg.

Ban Sai Kau, Nawngchik.

'General colour fuscous, some of the scales with a yellow base; skin of the neck irregularly blotched with black and yellow; top of the head sienna brown; under surface dirty white, with a fuscous bar on the neck followed by a patch of dull orange; scales on the tail paler in colour and broadly edged with black. Total length, 3,317 mm.'

'The Hamadryad seems to be commoner in the Patani States than the cobra, but the specimen preserved was the only one examined, and it is very easy to confuse with it a large specimen of *Zamenis korros* hastily seen. Our specimen was shot by Mr. Robinson, under a native house in the village of Sai Kau. It had taken refuge in a pile of cocoanuts, from which it was persuaded to come out by a Chinaman armed with a long pole; it attempted to crawl away, making no movement in our direction› though we were within a few yards of it. This was said to be the same individual which had bitten a man on the shin a day or two previously. According to this man's own story, he had been passing along a path close to the house under which the specimen was shot, when an "*ular selor*, as big as a cat," leaped out from behind a log and bit him. We were asked to see him the next day, and found him apparently dying of pain and fright; his leg was tremendously swollen but not above the knee, and had a slightly bluish tinge, and he felt pain in the glands under the arm-pits and elsewhere. We applied such remedies as we were able, and, what was more important, persuaded him and his friends that we could cure him. When we left Sai Kau, a week later, he was well on the way to recovery. I have described this incident, because I think that there is strong circumstantial evidence that the man actually had been bitten by a Hamadryad. It was certain that he had been bitten by a large poisonous snake, for the marks of the fangs, which were just visible, were far apart. I do not know of any poisonous snake "as big as a cat," except a Hamadryad or a large cobra, for the Malays gauge the size of an animal by its girth, rather than its length or height, and the bite was rather high on the limb for it to have been that of a species that lies on the ground like *Ancistrodon rhodostoma*. It is not at all improbable that poisonous snakes[1] are less deadly in the Malay Peninsula than the representatives of the same species in India, except, perhaps, the Hydrophinae.'

80. **Callophis gracilis**, Gray

Batang Padang, South Perak.

81. **Doliophis bivirgatus**, Boie.

Jalor. The typical form.

82. **Doliophis intestinalis**, Laur.

Bukit Besar and Batang Patang (vars. *annectens*, Belgr.; and *lineata*, Gray).

'The Malays of Patani say that both *D. bivirgatus* and *D. intestinalis*, which share the name of "sunbeam snake" (*ular sina mata-hari*), frequently progress with the bright coral-red part of their tails held upright, apparently in very much the same manner as *Cylindrophis rufus*, as figured by Captain

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[1] The proper Malay name of this snake is *ular selor*, and it is through a mistake of my own that it is called *ular telor* (egg snake), in Mr. Laidlaw's report on the snakes of the 'Skeat' Expedition. N. A.

FLOWER.[1] Moreover, they assert that all red-tailed snakes are very poisonous, believing that the "sunbeam snakes" flourish their tails in the air as an advertisement of the fact. It is probable that the observation that they flourish their tails is a true one, but it is very doubtful whether the species of *Doliophis* can be reckoned, practically, as dangerous forms, in spite of the enormous size of the poison glands in *D. bivirgatus*. *Cylindrophis rufus* is a most inoffensive and feeble snake, and many specimens are devoid of the red mark on the tail; indeed, it is probable that the whole theory of warning coloration, as far as the Patani Malays are concerned, rests on the fact that the readiest way of distinguishing between the venomous *Lachesis gramineus* and the harmless *Dryophis prasinus*, when the shape of the head cannot be seen, is the reddish tail of the former species.'

AMBLYCEPHALIDAE

83. Haplopeltura boa, Boie.

Bukit Besar, 2,000 feet.

'A specimen was taken lying almost straight along the midrib of the leaf of a small palm in the jungle. The whole coloration and attitude suggested a stick that had fallen from above, and the blunt snout and buff markings on the head appeared to represent that part of the stick which had been broken from its parent branch.'

84. Amblyocephalus moellendorffii, Bttg.

Jalor.

VIPERIDAE

85. Ancistrodon rhodostoma, Boie.

Jalor.

This large and deadly Crotaline snake was only recorded with certainty from Java, and with doubt from Siam. I have, however, been recently shown a specimen from Puket,[2] Siam, received by the Christiania Zoological Museum. The distribution is the same as that of the Chelonian *Damonia subtrijuga*.

'*A. rhodostoma* cannot be scarce in the neighbourhood of Biserat and K. Jalor, as several specimens, of which we did not keep all, were brought us at both of these places. The Jalor Malays call it *ular kapak daun*, or "leaf axe-snake," but, as Mr. LAIDLAW[1] has pointed out, the term *ular kapak* is of wide application, while the present species certainly shares the name of "leaf axe-snake" with *Lachesis gramineus*, and probably with other forms that resemble leaves living or dead. The persons who brought us specimens of *Ancistrodon rhodostoma* denied that its bite was fatal, though they said that it made a man very ill. This is curious, as peasants, whether British or Malay, have usually a tendency to exaggerate the dangerous qualities of animals with which they are liable to come in contact, and I do not think there was any superstitious reason[2] why they should speak no ill of this snake, for I asked them, on several occasions, after the specimen was dead and in spirit. They say that the "leaf axe-snake" lies about among dead leaves and is very sluggish, as its figure would suggest.'

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[1] *P.Z.S.*, 1899, pl. XXXVII.

[2] Puket is the chief place in the Siamese island of Junk Ceylon or Selangka, which lies off the west coast of the Malay Peninsula, south of the Isthmus of Kra. N. A.

APPENDIX

LIST OF THE BATRACHIANS AND REPTILES RECORDED FROM THE MALAY PENINSULA, SOUTH OF TENASSERIM

NUMEROUS additions have been made to our knowledge of the Batrachians and Reptiles of the Malay Peninsula, since the publication of Capt. S. S. FLOWER's useful list in the *Proceedings of the Zoological Society* in 1896 (p. 856). A second list given by Capt. FLOWER, in 1899 (pp. 600 and 885), is obscured by the fact that Siam is included. I therefore gladly fall in with the suggestion that a complete list should now be given, embodying the additions made by the 'Skeat' Expedition, the reptiles of which were described by Mr. F. F. LAIDLAW (*Proc. Zool. Soc.* 1900, p. 883, and 1901, i, p. 301, and ii, p. 575); and by the collections of Messrs. L. WRAY and A. L. BUTLER, and described by me (*Ann. Mag. N. H.* (7) v, 1900), and *Journ. Bomb. N. H. Soc.* xiii, p. 333 (1900), or listed by Mr. BUTLER (*Proc. Zool. Soc.* 1902, ii, p. 188).

In this list the names of species not in Capt. FLOWER's list of 1899 are marked with an asterisk (*).

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[1] *Proc. Zool. Soc.* 1901 (2), p. 576.

[2] Cf. *Fascic. Malay. Anthrop.*, part I., pp. 83, 104.

BATRACHIA

APODA

Caeciliidae

1. *Ichthyophis glutinosus*, Linn.
2. *Ichthyophis monochrous*, Blkr.

ECAUDATA

Pelobatdae

3. *Megalophrys montana*, Kuhl.
4. „ *nasuta*, Schleg.
5. „ *longipes*, Blgr.
6. *Leptobrachium hasseltii*, Tsch.
*7. *Leptobrachium heteropus*, Blgr. Larut, Perak (A. L. Butler).
*8. „ *pelodytoides*, Blgr. Larut, Perak (L. Wray).

Bufonidae

9. *Bufo penangensis*, Stol.
*10. „ *jerboa*, Blgr. Gunung Inas, Perak (Laidlaw).
11. „ *asper*, Gravh.
12. „ *melanostictus*, Schn.
13. „ *parvus*, Blgr.
14. *Bufo quadriporcatus*, Blgr.
15. „ *divergens*, Ptrs.
16. *Nectophryne guentheri*, Blgr.
*17. *Nectes subasper*, Tsch. Selangor (A. L. Butler).

Engystomatidae

18. *Calophryne pleurostigma*, Tsch.
19. *Phrynella pulchra*, Blgr.
20. „ *pollicaris*, Blgr.
21. *Microhyla ornata*, D. & B.
22. „ *inornata*, Blgr.
23. „ *leucostigma*, Blgr.
*24. „ *butleri*, Blgr. Larut, Perak (A. L. Butler).
25. *Microhyla pulchra*, Hallow.
26. „ *achatina*, Boie.
*27. „ *annectens*, Blgr. Larut, Perak (A. L. Butler).
28. „ *berdmorii*, Blyth.
29. *Callula pulchra*, Gray.

Ranidae

30. *Oxyglossus lima*, Gravh.
31. „ *laevis*, Gthr.
32. *Rana cyanophlyctis*, Schn.
33. „ *kuhlii*, D. & B.
34. „ *laticeps*, Blgr.
35. „ *macrodon*, Kuhl.
*36. „ *doriae*, Blgr. Larut, Perak (L. Wray).
37. „ *plicatella*, Stol.
38. „ *hascheana*, Stol.
39. „ *tigrina*, Daud.
40. „ *limnocharis*, Boie.
41. „ *macrodactyla*, Gthr.
42. „ *erythraea*, Schleg.
43. „ *labialis*, Blgr.
*44. „ *jerboa*, Gthr. Batu Caves, Selangor (A. L. Butler).
*45. „ *lateralis*, Blgr. Kuala Aring, Kelantan (Laidlaw).
46. „ *luctuosa*, Ptrs.
*47. *Rana signata*, Gthr. Gunung Inas, Perak (Laidlaw).
48. „ *glandulosa*, Blgr.
*49. „ *livida*, Blyth. Larut, Perak (L. Wray).
50. „ *larutensis*, Blgr.
51. *Rhacophorus leprosus*, Tsch.
52. „ *leucomystax*, Gravh.
*53. „ *bimaculatus*, Blgr. Larut, Perak (L. Wray).
*54. „ *robinsonii*, Blgr. Supra p. 136
55. „ *nigropalmatus*, Blgr.
*56. *Ixalus larutensis*, Blgr. Larut, Perak (A. L. Butler). Supra p. 139
57. „ *pictus*, Ptrs.
*58. „ *vermiculatus*, Blgr. Larut, Perak (A. L. Butler)
59. „ *asper*, Blgr.
*60. „ *horridus*, Blgr. Supra p. 139

REPTILIA

CHELONIA

Sphargdiae

1. *Dermochelys coriacea*, Linn.

Testudinidae

2. *Callagur picta*, Gray.
3. *Batagur baska*, Gray.
4. *Hardella thurgi*, Gray.
*5. *Damonia subtrijuga*, Schleg. & Müll.
Supra p. 142
6. *Bellia crassicollis*, Gray.
7. *Cyclemys amboinensis*, Daud.
8. *Cyclemys platynota*, Gray.
*9. *Cyclemys annandalii*, Blgr. Supra p. 142
10. „ *dhor*, Gray.
11. *Geomyda spinosa*, Gray.
12. „ *grandis*, Gray.
13. *Testudo emys*, Schleg. & Müll.
*14. „ *pseudemys*, Blgr. Supra p. 144
15. „ *elongata*, Blyth.

Chelonidae

16. *Chelone mydas*, Linn.
17. *Chelone imbricata*, Linn.
18. *Thalassochelys caretta*, Linn.

Trienychidae

19. *Trionyx subplanus*, Geoffr.
20. „ *hurum*, Gray.
21. „ *phayrii*, Gray.
22. *Trionyx cartilagineus*, Bodd.
23. *Pelochelys cantori*, Gray.

EMYDOSAURIA

Crocodilidae

24. *Tomistoma schlegelii*, S. Müll.
25. *Crocodilus porosus*, Schn.
26. *Crocodilus palustris*, Less.

LACERTILIA

Geckonidae

27. *Gymnodactylus marmoratus*, Kuhl.
*28. „ *peguensis*, Blgr.
Patalung (Laidlaw).
29. „ *pulchellus*, Gray.
30. *Gonatodes kendalli*, Gray.
31. „ *affinis*, Stol.
32. *Aeluroscalobates felinus*, Gthr.
33. *Hemidactylus frenatus*, Schleg.
34. „ *brookii*, Gray.
35. „ *depressus*, Gray.
36. „ *leschenaultii*, D. & B.
37. „ *flaviviridis*, Rüpp.
(coctaei, D. & B.)
38. „ *garnoti*, D. & B.
39. *Hemidactylus platyurus*, Schn.
40. *Mimetozoon craspedotus*, Mocq.
41. *Gehyra mutilata*, Wiegm.
*42. „ *larutensis*, Blgr.
Larut, Perak (A. L. Butler).
*43. „ *butleri*, Blgr.
Kuala Lumpur, Selangor (A. L. Butler).
44. *Lepidodactylus ceylonensis*, Blgr.
45. „ *lugubris*, D. & B.
46. *Gecko verticillatus*, Lawr.
47. „ *stentor*, Cantor.
48. „ *monarchus*, Schleg.
49. *Ptychozoon homalocephalum*, Crev.
50. „ *horsfieldii*, Gray.

Agamidae

51. *Draco volans*, Linn.
52. „ *maculatus*, Cantor.
53. „ *fimbriatus*, Kuhl.
*54. „ *punctatus*, Blgr. Larut, Perak (A. L. Butler). Supra p. 151
*55. „ *formosus*, Blgr. Larut, Perak (A. L. Butler). Supra p. 152
*56. „ *blanfordii*, Blgr. Larut, Perak (A. L. Butler). Supra p. 153
*57. „ *microlepis*, Blgr. Larut, Perak (A. L. Butler).
58. „ *melanopogon*, Blgr.
59. *Draco quinquefasciatus*, Gray.
60. *Aphianotis fusca*, Ptrs.
61. *Gonyocephalus herveyi*, Blgr.
62. „ *borneensis*, Schleg.
63. „ *grandis*, Gray.
64. *Acanthosaura armata*, Gray.
65. *Calotes cristatellus*, Kuhl.
66. „ *versicolor*, Daud.
*67. „ *emma*, Gray. Patalung (Laidlaw).
68. *Liolepis bellii*, Gray.

Varanidae

69. *Varanus flavescens*, Gray.
70. „ *nebulosus*, Gray.
71. *Varanus rudicollis*, Gray.
72. „ *salvator*, Laur.

Lacertidae

*73. *Tachydromus sexlineatus*, Daud. Biserat, (Laidlaw).

Scincidae

74. *Mabuia novemcarinata*. And.
75. „ *macularia*, Blyth.
76. „ *rugifera*, Blgr.
77. „ *multifasciata*, Kuhl.
*78. „ *siamensis*, Gthr. Supra p. 158
*79. *Lygosoma stellatum*, Blgr. Larut, Perak (S. Flower, A. L. Butler).
*80. „ *praesigne*, Blgr. Larut, Perak (A. L. Butler).
*81. „ *scotophilum*, Blgr. Batu caves, Selangor (A. L. Butler).
*82. „ *malayanum*, Doria. Larut, Perak (A. L. Butler).
*83. „ *floweri*, Laidlaw. Gunung Inas, Perak (Laidlaw).
84. *Lygosoma maculatum*, Blyth.
85. *Lygosoma anomalopus*, Blgr.
86. „ *olivaceum*, Gray.
87. „ *atrocostatum*, Less.
88. „ *singaporense*, Stdr.
*89. „ *bampfyldii*, E. Bartl. Larut, Perak (A. L. Butler).
90. „ *bowringii*, Gthr.
91. „ *albopunctatum*, Gray.
*92. „ *quadrivittatum*, Ptrs. Supra p. 159
*93. „ *surdum*, Blgr. Selangor (A. L. Butler).
94. „ *chalcides*, Linn.
*95. „ *larutense*, Blgr. Larut, Perak (L. Wray, A. L. Butler).
*96. „ *miodactylum*, Blgr. Supra p. 159

Dibamidae

*97. *Dibamus novae-guineae*, Blgr. Supra p. 160

OPHIDIA

Typhlopidae

98. *Typhlops lineatus*, Boie.
99. „ *braminus*, Daud.
*100. „ *albiceps*, Blgr. Larut, Perak (A. L. Butler).
101. *Typhlops bothriorhynchus*, Gthr.
102. „ *nigroalbus*, D. & B.

Boidae

103. *Python reticulatus*, Schn.
104. *Python molurus*, Linn.
105. *Python curtus*, Schleg.

Ilysiidae

106. *Cylindrophis rufus*, Laur.
107. *Cylindrophis lineatus*, Blanf.

Xenopeltidae

108. *Xenopeltis unicolor*, Reinw.

Colubridae

109. *Acrochordus javanicus*, Hornst.
110. *Chersydrus granulatus*, Schn.
111. *Xenodermus javanicus*, Reinw.
112. *Polyodontophis geminatus*, Boie.
113. „ *sagittarius*, Cantor.
114. *Xenochrophis cerasogaster*, Cantor.
*115. *Tropidonotus inas*, Laidlaw.
Gunung Inas, Perak (Laidlaw).
116. „ *trianguligerus*, Boie.
117. „ *piscator*, Schn.
118. „ *stolatus*, Linn.
119. „ *vittatus*, Linn.
120. „ *subminiatus*, Schleg.
121. „ *chrysargus*, Schleg.
122. „ *maculatus*, Edel.
123. *Macropisthodon flaviceps*, D. & B.
124. „ *rhodomelas*, Boie.
125. *Helicops schistosus*, Daud.
126. *Lycodon aulicus*, Linn.
*127. „ *laoensis*, Gthr. Khota Bharu,
Rhaman (Laidlaw).
*128. „ *butleri*, Blgr. Larut, Perak
(A. & L. Butler).
129. „ *effrenis*, Cantor.
130. „ *subcinctus*, Boie.
131. *Dryocalamus subannulatus*, D. & B.
132. *Zaocys carinatus*, Gthr.
133. „ *fuscus*, Gthr.
134. *Zamenis korros*, Schleg.
135. „ *mucosus*, Linn.
136. „ *fasciolatus*, Shaw.
137. *Xenelaphis hexagonotus*, Cantor.
138. *Coluber porphyraceus*, Cantor.
139. „ *taeniurus*, Cope.
140. „ *oxycephalus*, Boie.
141. „ *melanurus*, Schleg.
142. „ *radiatus*, Schleg.
143. *Gonyophis margaritatus*, Ptrs.
144. *Dendrophis pictus*, Gm.
145. „ *formosus*, Boie.
146. *Dendrelaphis caudolineatus*, Gray.
147. *Simotes purpurascens*, Schleg.
148. „ *cyclurus*, Cantor.
149. „ *octolineatus*, Schn.
150. „ *signatus*, Gthr.
151. „ *cruentatus*, Gthr.
152. *Ablabes tricolor*, Schleg.
153. „ *baliodirus*, Boie.
154. „ *longicauda*, Ptrs.
155. *Macrocalamus lateralis*, Ptrs.
156. *Pseudorhabdion longiceps*, Ptrs.
*157. *Calamaria vermiformis*, D. & B.
Larut, Perak (A. L. Butler).
158. „ *albiventer*, Gray.
159. „ *sumatrana*, Edel.
160. „ *leucocephala*, D. & B.
161. „ *pavimentata*, D. & B.
162. *Hypsirhina indica*, Gray.
163. „ *plumbea*, Boie.
164. „ *enhydris*, Schn.
165. „ *bocourtii*.
166. „ *sieboldii*, Schleg.
167. *Homalopsis buccata*, Linn.
168. *Cerberus rhynchops*, Schn.
169. *Fordonia leucobalia*, Schleg.
170. *Cantoria violacea*, Gir.
171. *Hipistes hydrinus*, Cantor.
172. *Dipsadomorphus multimaculatus*, Boie.
173. „ *gokool*, Gray.
174. „ *dendrophilus*, Boie.
175. „ *jaspideus*, D. & B.
176. „ *drapiezii*, Boie.
*177. „ *pallidus*, Blgr.
Supra p. 164.
178. „ *cynodon*, Boie.

Colubridae—*continued*

179. *Psammodynastes pulverulentus*, Boie.
180. *Dryophis xanthozona*, Boie.
181. „ *prasinus*, Boie.
182. *Dryophiops rubescens*, Gray.
183. *Chrysopelea ornata*, Shaw.
184. „ *chrysochlora*, Boie.
185. *Hydrus platurus*, Linn.
*186. *Thalassophis annandalii*, Laidlaw.
Patani (Laidlaw).
187. *Hydrophis caerulescens*, Shaw.
188. „ *nigrocinctus*, Daud.
189. „ *gracilis*, Shaw.
190. „ *cantori*, Gthr.
191. „ *fasciatus*, Schn.
*192. „ *rhombifer*, Blgr.
Coast of Perak (L. Wray).
193. „ *torquatus*, Gthr.
194. „ *obscurus*, Daud.
195. *Distira stokesii*, Gray.
196. „ *ornata*, Gray.
197. „ *brugmansii*, Boie.
*198. *Distira wrayi*, Blgr. Perak Coast
(L. Wray). Patani (Laidlaw).
199. „ *cyanocincta*, Daud.
200. „ *jerdoni*, Gray.
*201. *Enhydris curtus*, Shaw.
Patani (Laidlaw).
202. „ *hardwickii*, Gray.
203. *Enhydrina valakadien*, Boie.
204. *Aipysurus eydouxi*, Gray.
205. *Platurus laticaudatus*, Linn.
206. „ *colubrinus*, Schn.
207. „ *fasciatus*, Schn.
208. „ *candidus*, Linn.
209. *Bungarus flaviceps*, Reinw.
210. *Naia tripudians*, Merr.
211. „ *bungarus*, Schleg.
212. *Callophis gracilis*, Gray.
213. „ *maculiceps*, Gthr.
214. *Doliophis bivirgatus*, Boie.
215. „ *intestinalis*, Laur.

Amblycephalidae

216. *Haplopeltura boa*, Boie.
*217. *Amblycephalus vertebralis*, Blgr.
Larut, Perak (A. L. Butler).
218. *Amblycephalus laevis*, Boie.
219. „ *malaccanus*, Boie.
*220. „ *moellendorffii*, Bttgr.
Biserat, Jalor (Laidlaw).

Viperidae

*221. *Ancistrodon rhodostoma*, Boie.
Supra p. 170.
222. *Lachesis monticola*, Gthr.
223. „ *purpureomaculatus*, Gray.
224. *Lachesis gramineus*, Shaw.
225. „ *sumatranus*, Raffles.
226. „ *wagleri*, Boie.

CICENDELIDAE

BY

HERBERT C. ROBINSON

REPORT ON THE TIGER BEETLES (CICENDELIDAE)

By HERBERT C. ROBINSON

As Mr. Ridley has observed in a recent paper in the proceedings of the Straits Branch of the Royal Asiatic Society, the Tiger Beetles of the Malay Peninsula fall very readily into two divisions—(1) those which, like our European species, are essentially denizens of open country or of the seashore, and (2) those which are exclusively found in deep jungle. To the latter section great interest attaches, for they act as models, which are imitated by large numbers of other insects, more especially by beetles of other families and by Orthoptera.

The specimens in our collection have been identified by comparison with the series at the British Museum, which has been recently examined by Dr. Horn, but in the case of the difficult genus *Collyris* I cannot be absolutely certain of my identification, as in several instances I have had only a single specimen : in this connexion I must express my thanks to Messrs. Gahan and Arrow, who have always been ready to assist me in every possible way.

1. **Cicendela aurulenta**, Fabr.

This wide-spread species was common everywhere in open country in the Siamese Malay States, from sea level—though its place was taken on the shore by *C. sumatrensis*—to 3,000 feet, but we did not ourselves meet with it in Perak or Selangor. In habits, it exactly agrees with those of *C. campestris*, being found running with great rapidity along roads or on patches of damp or dry sand, often in the hottest sunshine, and readily making use of its wings when disturbed. The mode of flight and the dense white pubescence on the lower surface give the insect a close resemblance to certain of the smaller wasps, which it resembles also in the buzzing sound it produces when handled.

'Its variegated colour, however, renders it inconspicuous in broken light, when on sand strewn with scattered leaves and twigs.' N. A.

2. Cicindela fuliginosa, Dej.

Biserat, Jalor. 18th October, 1901.

The single specimen in the collection was brought in by native children among specimens of the preceding species.

3. Cicindela sumatrensis, Herbst.

Cape Patani. June, October, 1901.

Found running about in great numbers just above high-water mark on the muddy shores of Patani Bay, and round the edges of freshwater pools on Cape Patani. Much scarcer on the seaward face of the same sand-spit, which, at one point, is not more than twenty or thirty yards wide, its place being seemingly taken by small crabs and by Diptera of different families.

4. Cicindela minuta, Fabr.

Sungkei, South Perak. 8th February, 1902. (At light).

5. Cicindela chlorochila, Chaud.

Ban Sai Kau, Nawngchik. 26th April, 1901. (At light).

6. Heptadonta analis, Fabr.

Semangko Pass, Selangor-Pahang boundary. 2,500-2,700 feet. May, 1902.

This brilliant species was found in great abundance on paths running through fairly open jungle. I only met with it in one locality, but it is common in Singapore and Penang.

7. Tricondyla aptera, Oliv.

Biserat, Jalor. 11th July, 1901.

Mr. RIDLEY remarks that this beetle has a superficial resemblance to the large ant, *Camponotus gigas*, which is known to the Malays as *semut gajah* (elephant ant).

'I took two specimens of this species running about together on sand at the foot of a tall tree in open country. Their resemblance to a fossorial wasp,[1] common in the same environment, was so marked that the Malays with me begged me not to touch them, remarking that wasps of that kind stung very badly. The wasp is frequently seen running about on sand, with its wings folded in such a way as to be very inconspicuous, but at the same time to somewhat veil the brilliant irridescent blue of the abdomen. It never runs straight for any distance, being probably employed in hunting other insects, perhaps "ant lions," in the sand, but frequently stops for a moment, and then resumes motion in another direction. The beetle had exactly the same gait and movements, and its resemblance to the wasp was due to this rather than to any very detailed similarity of form or colour, though in these respects, too, there is a general likeness even in the set specimens. In the present instance, it would seem rather that the beetle mimicked the wasp than the wasp the beetle, the wasp being by far the commoner of the two insects, and also the more noxious. The bearing of Mr. RIDLEY's observation on this view is not clear, but, in any case, it is improbable that the resemblance between the Hymenopteron and the beetle was so close as in the instance observed by myself, for the movements of the ant referred to by Mr. RIDLEY bear a general likeness to those of the digging wasps, but are less rapid and abrupt, at any rate when the insects are undisturbed. The colour of the ant, moreover, is dark brown, instead of being metallic blue. Mr. SHELFORD[1] points out that in Borneo *Tricondyla cyanea* var. *wallacei*, a form resembling *T. aptera* in appearance, is mimicked in a very detailed manner by the Orthopteron *Condylodera tricondyloides*, which also mimics, in different stages of its growth, *T. gibba* and *C. sarawakensis*. It is very puzzling to find allied forms, of which some appear to act as models and others as mimics, but this would rather bear out Mr. ROBINSON's suggestion (*postea*, under *Collyris sarawakensis*) that in the case of these beetles and the forms which resemble them superficially we are dealing not with Batesian mimicry at all, but with a Müllerian association, some of the members of which may still be unknown. In considering a question of the kind it must be remembered that a large proportion of the insects reckoned scarce in collections are only "rare" because the particular habitat or locality in which they are abundant has not yet been discovered.' N. A.

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[1] Sphex lobatus, Fabr.

8. **Tricondyla wallacei** (Thoms.)

Bukit Besar, Nawngchik. 2,500 feet. 3rd September, 1901.

'Resting on end of twig in jungle; early morning.'

A single specimen is referred somewhat doubtfully to the above species.

9. **Collyris apicalis**, Chaud.

Bukit Besar, Nawngchik. 2,500 feet. August, September, 1901.

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[1] *Proc. Zool. Soc.* 1902 (2), pp. 233-234.

10. Collyris sarawakensis, Thoms.

Bukit Besar, Nawngchik. 2,500 feet. May, August, September, 1901.

This species and the preceding, which it closely resembles, were not uncommon on Bukit Besar. They frequented fairly open paths where there was much alternation of light and shade, and were extremely active and restless in their movements, settling for a few seconds on some projecting twig or leaf and then flying off with great rapidity. While on the wing they could with difficulty be distinguished from the smaller wasps of the family *Scoliidae* and from certain Diptera (*Sciomyzidae* ?), but this resemblance quite vanished when the beetles were at rest. Perhaps, however, the most interesting member of this mimetic association is a Heteromerous beetle, originally described by WESTWOOD as *Styrax tricondyloides*, and which appears to be exceedingly rare, as there is only a single specimen in the Bates collection at the British Museum. The single specimen that we captured, which we did not specially note at the time, was secured on Bukit Besar in the sweep net on April 20th, and so close was its resemblance to the three preceding species that it was actually taken down to the British Museum with the Cicendelids, and only recognized then on a rigid examination as not belonging to this family. Both it and its models have red legs and cyaneous elytra, which are strongly rugose at their anterior halves, while the posterior portion is smooth and shining, though in the case of *S. tricondyloides* it is slightly striated. The thorax of the mimic has two large tubercles on the disc, projecting slightly forwards as a kind of hump, with the result that the thorax appears to be slightly constricted anteriorly, as is the case in the species of *Collyris*.

It is not at first sight easy to understand why this section of the Cicendelids should be so very extensively mimicked[1] as they certainly are in the Eastern tropics. They are of course highly raptorial insects, but I am not aware that it has ever been shown that they are nauseous, while even if this was the case they are not, at any rate in the Malay Peninsula, sufficiently abundant for any protective qualities that they may possess to prove any advantage to their mimics. Possibly all cases in this group may ultimately be shown to be instances of Müllerian rather than Batesian mimicry, though the extreme rarity of the mimic is an argument against this supposition.

11. Collyris crassicornis, Dej.

Mabek, Jalor. 23rd July, 1901.

'Running on leaves of shrub, and flying rapidly from shrub to shrub.'

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[1] Cf. R. Shelford, *Proc. Zool. Soc.* 1902 (2), pp. 233-234, pl. xix, figs. 1-6.

12. Collyris filiformis, Chaud.

Bukit Besar. 2,500 feet. April, May, 1901.

13. Collyris variicornis, Chaud.

Bukit Besar, Nawngchik. 2,500 feet. May, September, 1901.

14. Collyris cribripennis, Thoms.

15. Collyris fuscitarsis, Schn.

16. Collyris ortygia, Buq.

The three preceding species were not uncommon on Bukit Besar in May and September.

17. Therates, sp. incert.

Bukit Besar, Nawngchik. 2,500 feet. May, 1901.

A couple of specimens of a small species of this genus were captured among low herbage. The form is not represented in the British Museum collection and does not appear to be described, but in the absence of further material I prefer not to name it.

ODONATA

Part I

BY

F. F. LAIDLAW, B.A., Cantab.

INTRODUCTORY NOTE

THE first part of Mr. Laidlaw's paper now published contains an account of a small section of the Odonata that, in the Malay Peninsula at any rate, is especially characteristic of the true jungle fauna. In the Patani States it is almost certain that it does not occur on the lower reaches of the rivers, nor, indeed, except in districts where the primaeval forest has been but little interfered with.

The species seem to be dependent on the presence of rapid running streams of clear water from which, with but few exceptions, they are rarely found far distant. It will be noted that the whole of our collection was obtained in three localities, and that more than two-thirds of the total number of specimens were captured in less than a week at Mabek in the Hulu Jalor, where the richness of the Odonate fauna far exceeded anything that we met with elsewhere. Dragon flies were very numerous at Bukit Besar, but for some reason, were exceedingly scarce at Telôm in January, where only three or four species were even seen, and with the exception of a few of the commoner rice-field forms, this scarcity was almost as noticeable in every place we visited in South Perak, during January and February, 1902, except at Jor.

The present list includes all the species of Agrioninae known to occur in the Peninsula, twenty-two in number, of which our collection contains representatives of eleven, though it is not improbable that this number will be largely increased when the mountainous districts of the Peninsula have been more fully explored.

HERBERT C. ROBINSON

REPORT ON THE DRAGON FLIES

BY F. F. LAIDLAW, B.A., CANTAB.

BEFORE commencing my description of Messrs. **ANNANDALE** and **ROBINSON**'s collection, I must acknowledge my indebtedness to Dr. F. **FÖRSTER** who has, with the greatest generosity, permitted me to incorporate in my lists the name of known species contained in a large collection in his possession from the mountains between Perak and Pahang; thus enabling me to give a very fairly complete list of the species known from the Peninsula (since his collection contains several species not contained in the present one, and *vice versâ*). But, in addition to this, he has furnished me with many valuable notes for inclusion in my paper. These notes are, in every case, printed within square brackets [ ], and it is hardly necessary for me to add that by his kindness Dr. **FÖRSTER** has greatly enhanced the interest, already very considerable, of the large and carefully-collected series of specimens obtained by Messrs. **ANNANDALE** and **ROBINSON**.

I take the opportunity of thanking Mr. **KIRBY**, of the British Museum, for his unfailing courtesy and ready assistance on several occasions when I have found it necessary to compare specimens with those in the British Museum. My thanks are also due to my mother, who has given me much assistance in transcribing the following notes.

As to the literature of the subject, sufficient reference to papers published before 1890 will be found in **KIRBY**'s invaluable *Catalogue of the Neuroptera Odonata*. Since that date the most important papers dealing with the Odonate fauna in the immediate neighbourhood of the Peninsula are **DE SELY**'s 'Odonates de Birmanie' (*Ann. Mus. Civ. Gen.* (2) x (1891)) and **KRUGER**'s important work on the Odonate fauna of Sumatra, published in the *Stettin Ent. Zeit.* of 1898-1899 and 1902.

Comparison of the present list of species with that contained in the two papers above mentioned will show that the fauna of the Peninsula is more closely related to that of Sumatra than that of Burmah.

I have recently published a brief account of a collection of dragon flies from the Malay Peninsula. References to these and other papers are given in the text when necessary.

PART I

AGRIONINAE (Calopteryginae, De Selys)

LEGION AGRION

1. Echo (Climacobasis) modesta, Laidlaw

♂ Climacobasis lugens, *Laidlaw*, *P.Z.S.* 1902 (1) p. 85, pl. vi, fig. 5.
♀ Echo modesta, *ibid. loc. cit.* p. 84, pl. v, fig. 6.

A fine series of 5 ♂ and 2 ♀ all from Bukit Besar, Nawngchik, from an altitude of 2,500-3,000 feet.

There can be no doubt that the two species which I founded on a single specimen in each case, are merely male and female of the same species. The generic name may be retained as that of a section of the genus *Echo*, distinguished by the great relative length of the pterostigma in the male, in which it is about three times as long as in the female. This character serves to separate this species from the two or three species of *Echo* already known in which the pterostigma of the male is described as being short, or at most, only very slightly longer than in the female.

On the other hand, it is readily distinguishable from the remarkable *Archineura*, which it resembles in the length of the pterostigma by its smaller size and less complex neuration.

I have already described the characters of the female from a somewhat immature specimen. The mature female differs in having the pterostigma dark brown.

As to the male, the curious white pruinose mark on the top of the head is only present in fully mature specimens. The wings are shorter and narrower than in the female, and the abdomen is slenderer, the ninth segment is only one-half the length of the eighth.

The upper pair of appendages are one-third as long again as the lower pair, and about as long as the ninth segment.

The pterostigma in the adult male is black. In young males it is whitish brown.

The following is the literature dealing with this and allied genera :—

SELYS. *Synopsis des Calopterygines*
Monographie des Calopterygines, 1854

(*Echo margarita* ♀ described)

„ *Bull. Acad. Belg.* (2) xlvii, p. 356 (1879)

Echo margarita ♂, ♀ described
„ „ race ? *tripartita* ♂, ♀ described
Echo ? uniformis ♂ „

Selys. *Ann. Soc. Ent. de Belgique,* xlii (1898), p. 335.

E. uniformis, ♂ ♀, described

Karsch. *Berl. Ent. Zeitschr.* xxxvi, p. 455 (1891).

E. incarnata described

Ent. Nachr. xx, No. 6, p. 84 (1894)

Remarks on Kirby's *Archineura basilactea*

Kirby. *Ann. Mag. Nat. Hist.* (6) xiii, p. 86 (1894)

Archineura basilactea described

loc. cit., p. 450. Reply to Dr. Karsch (see above)

MacLachlan. *Ann. Mag. Nat. Hist.* (6) xvii, p. 370 (1896)

Remarks on *Archineura incarnata,* Karsch

Kruger. *Ent. Zeit. Stettin,* 1898, p. 72

E. iricolor, n. sp. ♂ ♀, ? = E. uniformis

„ *loc. cit., E. iricolor* = *E. uniformis*

Laidlaw. *Proc. Zool. Soc.* 1902, pp. 84, 85

Echo modesta and *Climacobasis lugens* described

2. Neurobasis chinensis (Linn.)

Neurobasis Chinensis, *Kirby, Cat. Odonata,* p. 102 (1891) ; *Kruger, Stett. Ent. Zeit.,* 1898, p. 74 ; *Först. Ann. Soc. Ent. Belg.* xli, p. 210 (1897) ; *Laidlaw, P.Z.S.* 1902, p. 86.

10 ♂, 3 ♀, taken in July in Jalor. Mostly noted as having been caught 'flying over the river.'

'Frequents places where the current is strong, occasionally flying along with hind wings depressed, just touching the surface of the water ; then very conspicuous, the hind wings appearing emerald green in sunlight and peacock blue in subdued light. Often settling on a black rock, with the wings raised over the back as in a butterfly ; in this position quite inconspicuous.'

All the females belong to the typical variety *quadrimaculata*. 'Wings golden brown with yellow spots on the anterior margin.'

['Camp Jor'[1] (GRUBAUER) var. *quadrimaculata*, var. *bipunctata*, and var. *florida*, also forms with variations in the length of the legs.']

The var. *florida* occurs in Penang and in the Baram district of Borneo.

3. **Vestalis amoena,** Hagen

Vestalis amoena, *Kirby*, *Cat. Odonata*, p. 103 (1891) ; *Kruger*, *Stett. Ent. Zeit.*, 1898, p. 75 ; *Laidlaw*, *P.Z.S.* 1902 (i), p. 87.

6 ♂, 2 ♀. Bukit Besar, Nawngchik. 2,500-3,000 feet. May and August, 1901.
2 ♀. Bukit Besar, Nawngchik. 2,000 feet. September, 1901.

'Jungle near water, dull morning.'

1 ♂. Mabek, Jalor. July, 1901.

'Flying in the jungle, mid-day.'

1 ♀. Jarum, Rhaman. April, 1902.

'Very common in jungle, *not necessarily near water;* abdomen dark bronze, thorax dark emerald green, eyes black, wings purplish irridescent.'

Occurs also in Dr. FÖRSTER's collection. Perhaps the commonest Calopterygine that occurs in the Peninsula. Its habits are markedly in contrast with those of most of its nearest relatives.

3. **Vestalis lugens,** Alb.

['1 ♂. Taken by GRUBAUER at Camp Jor at an altitude of 2,000 m. (? ft.[1]). Identical with specimens from High-Sumatra.']

LEGION EUPHAEA

4. **Euphaea ochracea,** Selys

Pseudophaea ochracea, *Kirby*, *Cat. Odonata*, p. 109 (1891).
Euphaea ochracea, *Selys*, *Ann. Mus. Civ. Genoa*, (2) x, p. 489 ; *Laidlaw*, *P.Z.S.* 1902 (i), p. 87.

One male, from the State of Patani ? (more probably from Bukit Besar).

'*Puting betiong*, Patani Malay for dragon flies generally. Wings deep copper colour, abdomen and head black, thorax marked with dull crimson. Jungle stream, mid-day.'

---

[1] If the 'Camp Jor' of Grubauer is the same place as that visited by us (cf. itinerary) its approximate altitude is 2,000 *feet*, not metres. There is no camp in the Perak-Pahang boundary range as high as 2,000 metres, the extreme summits of a few mountains only just exceeding this height. EDD.

The colour of the abdomen is of a very dull dark-brown rather than black. The wings appear of a much richer colour when the insect is flying than after death.

This species belongs to a group of closely allied species or perhaps geographical races, which range from the Khasia Hills (where *E. brunnea*, a fairly distinct form, much larger than the typical *E. ochracea* occurs) through Burmah and the Peninsula into the Archipelago, where again the forms are mostly large, *e.g.*, *E. lara* from Sumatra, etc.

['Camp Jor (GRUBAUER) with variations in size: Kelantan (WATERSTRADT).']

5. **Euphaea masoni**, Selys

Pseudophaea masoni, *Kirby*, *Cat. Odonata*, p. 110 (1891).

4 ♂. Mabek, Jalor. July, 1901.

' Black, except for the transparent patches on the wings.'

These specimens agree closely with the types from Tenasserim, but the costal spaces are not black, only the sub-costal spaces are so coloured. Occurs also in Tonquin.

6. **Euphaea aspasia**, Selys

Camp Jor, 2,000 m. (? ft.) (GRUBAUER).

[' Identical with specimens received from Mr. G. SCHREIDER from Dalak, mountains of Rajah, High Sumatra.']

7. **Euphaea impar**, Selys

Recorded by myself (*P.Z.S.* 1902 (i), p. 87) from the Kelantan River. Not represented in this collection.

8. **Dysphaea limbata**, Selys

Dysphaea limbata, *Kirby*, *Cat. Odonata*, p. 110 (1891); *Kruger*, *Stett. Ent. Zeit.*, 1898, p. 78; *Laidlaw*, *P.Z.S.* 1902 (i), p. 88.

♂. Mabek, Jalor. July, 1901.

' On river ; colour velvety black, with a shade of purple on the wings.'

[' ♂. Camp Jor (GRUBAUER) : Kelantan (WATERSTRADT).']

I believe that no specimen has previously been captured so far to the north as that taken in Jalor. The genus is confined to the Peninsula and to the Islands of Java, Sumatra, and Borneo.

LEGION LIBELLAGO

The distribution of *Rhinocypha*, perhaps the most characteristic Oriental Odonate genus, presents several features of interest. Firstly, it is noteworthy that no species of the genus is known from Ceylon. Compare with this the absence of the genus *Draco* among lizards, and *Diplommatina* and *Alycaeus* amongst the land Mollusca ; all three otherwise widely spread and characteristic of the whole Oriental region. It will be interesting to learn whether other cases of this nature occur.

Following De Selys, the genus may be subdivided roughly as follows :—

A. Two rows of postcostal cells (often rudimentary) ; opaque marks on hind wings of males, with hyaline 'windows.'
1. Group of *R. quadrimaculata.*
B. A single row of postcostal cells.
(*a*) Opaque marks on the hind wings of the males, with hyaline windows.
2. Group of *R. perforata.*
(*b*) Opaque marks on hind wings without 'windows ;' the females in some cases also have opaque marks on the hind wing.
3. Group of *R. tincta.*

Group 1 is mainly Himalaic, and as far as I know, confined to the mainland of Asia. *R. fenestrella*, its representative in the Peninsula, which is very closely allied to *R. quadrimaculata*, Selys, of India, and to *R. spuria*, Selys, of the Khasia Hills, extends further south than any other species of the group.

Group 2 has one species in Thibet, viz., *R. trimaculata* ; the remaining species range from India to Cochin China and Hainan, and down into the Peninsula and the greater Sunda Islands, but not further east than Java. The Peninsular species are *R. biforata* and *R. apicalis.*

Group 3, typified by *R. tincta*, is capable of further sub-division, but this cannot be attempted within the limits of the present paper. It contains numerous species ranging from Sumatra and the Peninsula, where it is represented by the interesting little *R. karschi*, intermediate between *R. heterostigma* and *R. tincta*, and by *R. petiolata*, to New Guinea.

Thus in the Peninsula, and apparently there only, the three groups overlap.

9. **Rhinocypha fenestrella,** Ramb.

Rhinocypha fenestrella, *Kirby, Cat. Odonata*, p. 113 (1891) ; *Selys, Ann. Mus. Civ. Genoa* (2) x, p. 491.

8 ♂, 2 ♀. Bukit Besar, 2,500 feet, Nawngchik. May, 1901.

'♂ Rests on stones in streams, with wings almost touching the body along their whole length.'

With another male is the following note :—'Jungle stream, mid-day ; white under surface of tibiae conspicuous in this specimen, which was hovering round the female, a dull greenish insect.' A female is said to have the thorax marked with pale green, and to be most inconspicuous.

5 ♂, 1 ♀. Telôm, Perak-Pahang border, altitude 4,000 feet. January, 1902.

Note with a male, 'Dances in the air before the female, displaying white surface of tibiae.'

2 ♀. Upper Batang Padang Valley, 3,000 feet, South Perak. January, 1902.

[Camp Jor, 2,000 m. (ft. ?) (GRUBAUER) : Kelantan (WATERSTRADT)].

10. Rhinocypha biforata, Selys

Rhinocypha biforata, *Kirby*, *Cat. Odonata*, p. 113 (1891) ; *Laidlaw*, *P.Z.S.* 1902 (1), p. 88.

2 ♂. Mabek, Jalor. July, 1901.

One 'flying over river,' the other, 'on edge of jungle stream. Dull morning. Thorax velvety black, marked on the sides with pale blue. In the centre of the dorsal surface a triangular mark of mauve pink. On the sides five stripes, pink posteriorly shading into blue anteriorly. Abdomen black with delicate blue marks on the sides. Legs and head black.'

[Camp Jor and Kelantan].

11. Rhinocypha apicalis, Kruger

Rhinocypha apicalis, *Kruger*, *Stett. Ent. Zeit.*, 1898, p. 79.
Rhinocypha inas, *Laidlaw*, *P.Z.S.* 1902 (i), p. 90, pl. vi, fig. 7.

[Camp Jor, 1,200 m. (ft. ?) (GRUBAUER) : Kelantan (WATERSTRADT)].

I believe that Dr. FORSTER is correct in identifying my species with that very briefly noted by KRUGER. When I wrote my description of *R. inas*, I had not the opportunity of comparing it with *R. bisignata*. It certainly resembles *R. whiteheadi* from Hainan very closely.

12. Rhinocypha petiolata

Recorded from the Peninsula, but not included in the present collection.

13. Rhinocypha karschi, Kruger

Rhinocypha karschi, *Kruger*, *Stett. Ent. Zeit.*, 1898, p. 33 ; *Laidlaw*, *P.Z.S.* 1902 (i), p. 90.

Not included in the present collection; taken by myself on the Aring River, in Kelantan.

14. **Micromerus stigmatizans,** Selys

Micromerus stigmatizans, *Kirby*, *Cat. Odonata*, p. 115 (1891).

This and the next species belong to a section of the genus in which the males have a pterostigma on all four wings, while in the remaining species of the genus the pterostigma is absent on the fore wings. This section appears to be confined to the Peninsula, where two species occur, and to Borneo, which has three species. Neither of the Peninsular species is included in the present collection.

15. **Micromerus hyalinus,** Selys

16. **Micromerus lineatus,** Burm.

Micromerus lineatus, *Kirby*, *Cat. Odonata*, p. 115 (1891).

5 ♂, 1 ♀. Mabek, Jalor. July, 1901.

The following is a note on one of the males :—'Flying over river at mid-day; the wings moved so fast that they were quite invisible. Head and thorax velvety black, marked with pale yellow green. Abdomen, five proximal segments orange yellow, marked with black; distal segments velvety black, as is the ventral surface. Anterior surface of tibiae white.' The female was taken flying with the male.

['Camp Jor (GRUBAUER). The black marks on the dorsal surface of the abdomen appear to become more extended with age.']

17. **Micromerus signatus,** Kruger

Recorded from Penang.

18. **Micromerus aurantiacus,** Selys

Not included in the present collection.

19. **Micromerus annandali,** sp. nov.

1 ♂. Mabek, Jalor. July, 1901.

'On river. Dorsal surface of abdomen deep red.'

Related to *M. aurantiacus* and possibly a local race, but sufficiently distinct to merit a description and name.

The most obvious distinction lies in the colour of the dorsal side of the abdomen, which in *M. aurantiacus* is golden or orange yellow, but in the present species, dark brick-red. The dorsal surface of the head is black. There are four small yellow spots lying at the angles of a square just in front of the anterior ocellus, two others on either side of the two posterior ocelli, and two others, more widely separated, behind those on the vertex.

Prothorax black, with a pair of lateral yellow spots, an anterior yellow line, and a posterior yellow median spot.

Thorax black, the mesothoracic ridge and a pair of narrow antehumeral stripes incomplete above, yellow. Humeral stripes reduced to a small yellow mark at the upper end of the suture. Two broad lateral stripes on either side yellow, the anterior pair interrupted at about its middle, and again near its upper end by a projection into it of the black ground-colour.

Abdomen, upper surface deep red, articulations black; under surface orange yellow with a broad median stripe, but the whole under-surfaces of segments 9-10 is black. Sides of segment 1 black with a round yellow spot. On either side of segments 2-6 is a triangular yellow mark, with its apex directed backwards, enclosed within a black border. In segments 2-4 the black margin does not quite reach the hinder limit of the segment, whilst in segments 5-6 it does so, and the black commences to widen out against the articulation. From segments 7-10 the yellow mark is absent, and the black now forms a triangle with its apex directed forwards. The sides, beyond the triangle in segments 2-4, are yellow. On the dorsal side of segments 2-3, near their hinder ends, is a transverse black mark interrupted in the middle.

Anal appendages black, the upper pair rather long and slender, without projections, three times as long as the lower pair, which are rather stouter and conical. Legs black, the inner sides of the last two pairs of femora whitish distally.

Wings very narrow and brightly irridescent. No pterostigma on the anterior pair, which have 5-6 antenodals. Apical spot longer than it is broad, not reaching the hind margin, rather less than one-fifth the length of the wing. Pterostigma (of hind wing) black, covering rather more than two cells.

Length of abdomen, 13 mm.; hind wing, 15·5 mm.; apical spot, 2·75 mm.

20. **Micromerus semiopacus**, Selys

['There exist three closely-related forms or "sub-races" living, perhaps, separately in Borneo, Sumatra, and the Malay Pensinula, viz., *M. semiopacus*, Selys (type) in Borneo; *M. semiopacus*, Selys, sub-race *martinae*, Karsch in

Sumatra; and *M. semiopacus* sub-race *affinis*, Laidlaw in Kelantan (♂, ♀, Laidlaw; ♂ ♂, Waterstradt). Karsch compares *M. martinae*, Karsch, with *M. xanthocyaneus* from the Celebes. But Karsch's species undoubtedly differs but slightly from the typical Bornean *M. semiopacus*, Selys. In *M. semiopacus* the dark tips of the fore wings are 6¼ mm. in length, in *M. martinae*, 5 mm., and in *M. affinis*, 5½ (Laidlaw), and in Waterstradt specimens only 4 mm. In all these forms the dorsal surface of segments 3-5 of the abdomen carries a longitudinal rectangular light yellowish spot, which is divided in two by the black carina. In some cases, by an angular encroachment of the black ground from the sides, these paired spots are changed into two, 7 set back to back. The 7-shaped marks occur in segments 4-5 of *M. affinis*, in 3-4 of *M. semiopacus* (probably also in 5), and very imperfectly in *M. martinae*.

Segment 6 is identical in all three, and the light mark projects as a rectangle from the anterior margin of the segment. In *M. lineatus*, on the other hand, it projects as a rhomboid, and in *M. stigmatizans* nearly as a circle.

M. martinae is more distinct from the typical form, *M. semiopacus*, than is *M. affinis*, which is very nearly identical with it, since the extent of the opaque apical spot of the fore wing is evidently variable, and the darkened tip of the fore wing is merely a mark of age. In all three the epistone is metallic blue, partially wrinkled. In *M. affinis* the light markings of the abdomen are pale green.']

The continuance of the black apical mark on the fore wing, right across the wing, serves to distinguish these three species at a glance from those of the *lineatus* group.

My specimens of *M. affinis* were, to the best of my recollection, pale yellow in colour in life, so far as the markings of the abdomen are concerned.

(See Karsch, *Ent. Zeit.*, Berlin, xvii (1891), No. 16, for *M. martinae*; for *M. affinis*, see Laidlaw, *P.Z.S.* 1902 (i), p. 90, pl. vi, fig. 7).

LEGION AMPHIPTERYX

21. Devadetta argyroides (Selys)

Devadetta argyroides, *Kirby*, *Cat. Odonata*, p. 111 (1891).

1 ♂, 3 ♀.	Bukit Besar, 2,500 feet, Nawngchik.	May, 1901.
1 ♂.	Mabek, Jalor.	July, 1901.

'Flying beside jungle stream.'

Two of the female specimens from Bukit Besar where taken 'flying in the jungle,' one 'in the morning' and 'early afternoon, before rain.' The male is labelled 'jungle stream, mid-day.' One of the females is briefly described as follows :—' Abdomen dark-brown with paler bars, fawn spot on wings (*pterostigma*), faint blue spots on thorax.' The coloration is, in fact, practically identical with that of the male.

The first two joints of the antennae in both sexes are stout, the second nearly half as long again as the first ; the third is short and club-shaped, slenderer than the second. To the generic characters given by DE SELYS, it may be added that the wings are petidated almost to the level of the commencement of the quadrilateral.

I have examined a specimen of this species collected on Mount Kina Balu, in Borneo.

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FASCICULI MALAYENSES

FASCICULI MALAYENSES

ANTHROPOLOGICAL AND ZOOLOGICAL RESULTS OF AN EXPEDITION TO PERAK AND THE SIAMESE MALAY STATES, 1901-1902

UNDERTAKEN BY

NELSON ANNANDALE AND HERBERT C. ROBINSON

UNDER THE AUSPICES OF THE UNIVERSITY OF EDINBURGH AND THE UNIVERSITY OF LIVERPOOL

ZOOLOGY

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NON-OPERCULATE PULMONATA

BY
WALTER E. COLLINGE, M.Sc.
THE UNIVERSITY, BIRMINGHAM

INTRODUCTORY NOTE

NO particular attention was paid to the collection of Mollusca either by Mr. ANNANDALE or myself, and, as has been noted previously, the drought that prevailed during a great portion of our stay in the Siamese Malay States was very unfavourable to most forms of invertebrate life. The majority of our collecting stations, moreover, were situated on granite, where the molluscan fauna is naturally poor, but the limestone hills and caves in the vicinity of Biserat would probably afford a rich harvest if carefully searched during the rainy season. The districts covered by the 'Skeat' Expedition and ourselves in the Eastern States were, to all intents and purposes, identical, and the fact that out of thirty-eight species in the two lists only one is common to both, shows that on the Eastern side of the Peninsula, at any rate, almost everything remains to be done in this branch of zoology; though on the west coast our knowledge is much more complete owing to the researches of STOLICZKA, GODWIN-AUSTEN, DE MORGAN, and MOELLENDORF.

HERBERT C. ROBINSON

REPORT ON THE NON-OPERCULATE LAND MOLLUSCA

By WALTER E. COLLINGE, M.Sc.
THE UNIVERSITY, BIRMINGHAM

THE collection of Non-Operculate Land Molluscs made by Messrs. Annandale and Robinson during 1901 and 1902 in the Malay Peninsula, and which has been placed in my hands for identification and description, is not a large one, and many of the species I have dealt with in my account of the Non-Operculate Land and Freshwater Molluscs collected by the members of the 'Skeat' Expedition in 1899 and 1900.[1] There are, however, a few species which were not obtained on this expedition, and these are of particular interest.

Firstly, I would mention the occurrence of a new species of *Damayantia*, Issel, which genus has not hitherto been recorded from elsewhere than Borneo; its distribution is thus extended considerably westward. A new species of *Parmarion*, P. Fisch., is described from Bukit Besar, while an example of *Helicarion lowi*, De Morgan, enables me to give some account of the anatomy, from which it will be seen that it can no longer be retained in that genus, but finds a more natural position in the genus *Nilgiria*, Godw.-Aust. Finally, a new species of *Atopos*, Simr., offers an opportunity of further adding to our knowledge of the anatomy of this most interesting genus, though there yet remain many gaps.

In all, the collection comprises representatives of twenty-three species, which are contained in seventeen genera; of these, five species are new.

My best thanks are here tendered to the Council of the Birmingham Natural History and Philosophical Society for a grant towards the cost of the figures illustrating this work.

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[1] *Journ. of Malac.* 1902, vol. ix, pp. 71-95, pls. iv-vi.

DAMAYANTIA, Issel

1. Damayantia minima, sp. nov.

(Pl. XI, Figs. 1, 2)

Animal yellowish-brown, with a dark lateral band posteriorly, and an irregular black patch on the right side anteriorly. Mantle completely covers the shell; colour same as the body with three dark blotches in the middle. The dorsum is sharply keeled and lighter in colour. Rugae scarcely visible anteriorly, posterio-laterally large and somewhat rhomboidal; absent on the mantle. Caudal mucous pore large and overlapped by the extremity of the tail. Peripodial groove faint. Foot-fringe yellowish-brown, lineoles absent; foot-sole same colour, with median and lateral planes.

Length (in alcohol), 12·5 mm.

Gedong, Batang Padang, South Perak.

Hitherto the genus has only been recorded from Borneo. The present species differs from *D. dilecta*, Issel, the type of the genus, in its smaller size, colour, absence of lineoles on the foot-fringe, the smaller mantle lobes, and the position of the visceral mass in relation to the body posterior to it.

PARMARION, P. Fisch.

2. Parmarion malayana, sp. nov.

(Pl. XI, Figs. 3, 4; Pl. XII, Figs. 11-13)

Animal fawn coloured, with faint dirty blue streak at each side of the dorsum posterio-laterally. Mantle fawn coloured with irregular deep brown markings; keeled on the left side. Head marked by two prominent dark blue bands, which extend on to the bases of the upper tentacles. Rugae faint, small, and oval shaped. Peripodial groove distinct. Foot-fringe same colour as the body, with faint lineoles. Foot-sole dirty yellow, with median and lateral planes.

Length (in alcohol), 30 mm.

Shell oval in form, amber coloured, semi-transparent and membraneous; whorls two-and-a-half; the first, which is very small, being calcareous. Maj. diam. 6·5; min. diam. 4 mm.

Bukit Besar, Nawngchik. 2,500 feet.

The Generative Organs (Pl. XII, Figs. 11-13).

The generative organs in general form agree with those of other Malayan species, there is one notable difference, however, viz., the penis does not exhibit the beak-like distal end, common to so many species. The form of the species reminds one of this same organ in some species of *Girasia*, Gray. The vestibule is wide, and leading into it in the middle portion is the vagina, a long, wide, spacious tube, which distally receives the short duct of the receptaculum seminis. The free oviduct is very short and scarcely differentiated from the common duct, which is thrown into a single fold and richly convoluted. The penis commences as a wide muscular tube, and at the point where the retractor muscle is inserted becomes bulbous, and makes a sharp turn upon itself, then gradually tapering passes into the vas deferens which joins the common duct on the opposite side to and just above the opening of the receptacular duct. Internally the lumen of the penis does not agree with the external form, agreeing in this character with the genus *Microparmarion*, Simr. At the proximal end the penis is a fine canal which makes a bend to the right side and then to the left side, it is then continued as a fine tube to the region where the penis is folded upon itself; here it expands into a sac-like chamber which is connected by a tube-like portion with a further dilation, which latter gradually lessens in size, continuing on the ventral side of the organ, and ultimately passes into the vas deferens (Pl. XII, Fig. 12).

HELICARION, Fér.

3. Helicarion permolle, Stol.

Helicarion permolle, *Stol. J. A. S. B.* xlii, p. 18, pl. i, fig. 11; pl. ii, figs. 21-23 (1873).

Telôm, Perak-Pahang boundary. 4,000 feet.

ARIOPHANTA, Desmoulins

4. Ariophanta janus (Chem.)

Helix janus, *Martini and Chemnitz*, *Conch. Cab.* xi, p. 307, figs. 3016, 3017.

Bukit Besar, Nawngchik. 2,500 feet.

NILGIRIA, Godw-Aust.

5. Nilgiria lowi (De Morgan)

(Plate XII, Figs. 14-16)

Helicarion lowi, *De Morgan*, *Bull. Soc. Zool. Fr.* x, p. 25, pl. i, figs. 3a-3d (1885).

From a single alcoholic specimen collected at Bukit Besar (3,000 feet), I am able to give the following particulars. The animal is a deep chrome yellow, with dark-blue or greenish-blue blotches ; the head and tenacles are also a dark greenish-blue colour. The peripodial groove is well defined, and terminates below the large caudal mucous pore. The foot-fringe is yellow, marked with irregular blotches of blue ; the foot-sole a dirty yellow and marked by a shallow median groove, possibly due to the alcohol. The extremity of the foot terminates bluntly. The specimen measured 31 mm. in length, and the foot-sole 9 mm. in breadth. The shell was broken, but at least a third less than that described and figured by De Morgan. It has four whorls, and is thin and horn-coloured.

This species can no longer be retained in the genus *Helicarion*, Fér., which seems to be a repository to certain authors for all thin semi-transparent shells of three or four whorls. It is closely related to certain species of *Ariophanta*, in which the dart is represented by a small simple muscular organ, and for such I would suggest that the name of *Nilgiria*, Godw.-Aust., should be retained.

The Rev. Professor H. M. Gwatkin has very kindly examined a mounted specimen of the radula, which I sent him, and he states that he sees no reason why the species should not be referred to *Ariophanta*, though, as he points out, the genus is by no means in a satisfactory state.

The Generative Organs (Pl. XII, Figs. 14-16).

The vestibule is a wide sac-like pouch, into which the penis and dart-sac open at the right and left sides opposite to one another, while posteriorly is the opening of the vagina. The receptaculum seminis is a wide tubular sac, and of considerable length. The free-oviduct, common duct, and albumen gland call for no special mention. The penis is a long thick muscular organ, with a definite epiphallus and kalk sac, the vas deferens joining it just below this latter organ. The retractor muscle is inserted at the distal end of the penis, at which point the latter organ exhibits a slight enlargement. Internally there is a large long penis which distally exhibits a peculiar spongy-like cap or covering (Pl. XII, fig. 16) ; this specimen was in only poor condition, and I was therefore unable to make out the structure as clearly as I should have liked. The dart gland and dart sac are of the usual form, and in the latter there is present a small muscular papilla very similar to those present in other species of *Nilgiria*.

EUPLECTA, Semper

6. Euplecta bijuga (Stol.)

Rotula bijuga, *Stol. J. A. S. B.* xlii, p. 14, pl. i, figs. 4-7 ; pl. ii, figs. 16-18 (1873).

Bukit Besar, Nawngchik. 3,000 feet.

7. **Euplecta**, sp.

Bukit Jalor, Jalor. 300 feet.

MACROCHLAMYS, Bens.

8. **Macrochlamys resplendens** (Philippi)

Helix resplendens, *Philippi*, *Zeitschr. f. Malac.* 1846, p. 192.

Macrochlamys (?) resplendens, *Godw.-Aust. Moll. of India*, p. 109, pl. xxvi, figs. 1-3 (1883).

Bukit Besar, Nawngchik. 3,000 feet.

Three very fine specimens, the largest of which measures 23 mm. max. diam.

9. **Macrochlamys hardwickei**, Godw.-Aust.

Macrochlamys hardwickei, *Godw.-Aust. Moll. of India*, p. 105 (1883).

Cape Patani, Jhering.

HEMIPLECTA, Albers.

10. **Hemiplecta sakaya** (De Morgan)

Oxytes sakaya, *De Morgan*, *Bull. Soc. Zool. Fr.* x, p. 32, pl. vi, figs. 1a-1c (1885).

Hemiplecta sakaya, *Mlldff. P.Z.S.* 1891, p. 334.

Bukit Besar, Nawngchik. 2,500 feet.

11. **Hemiplecta salangana**, v. Marts.

Nanina (Hemiplecta) salangana, *v. Marts. Conch. Mitth.* 11, p. 134, pl. xxv, figs. 8-12.

var. martensi, var. nov.

I am indebted to Professor E. von Martens for very kindly comparing a shell from Bukit Besar with specimens of this genus in the collection in the Berlin Museum. He regards it as near to *H. salangana*, v. Marts., from the island of Salanga or Junk Ceylon, on the north-west coast of the Malay Peninsula. It differs, however, from that species the type of which measures 44 mm. maj. diam., in its larger size being 52 mm., and a somewhat malformed specimen in which the sutures are very deep is 57 mm. It is also more darkly coloured and the umbilicus larger.

Mr. E. R. SYKES was good enough to compare it with specimens of *Hemiplecta* in the collection of the British Museum, and he informs me that there is one smaller specimen, unnamed, from Kelantan.

I have much pleasure in associating with this interesting variety the name of one of the distinguished Directors of the Berlin Museum, Professor E. VON MARTENS.

TROCHOMORPHA, Albers.

12. Trochomorpha timorensis, v. Marts.

Trochomorpha timorensis, *v. Marts. Preuss. Ost.-Asiat. Exped.* Bd. ii, p. 248 (1867); *Stoliczka, J. A. S. B.* xlii, p. 22, pl. i, fig. 17; pl. ii, figs. 10-12.

Bukit Besar, Nawngchik. 2,500 feet.

SITALA, A. Ad.

13. Sitala infula (?), Benson

Sitala infula, *Benson, Ann. Mag. Nat. Hist.* 1848, p. 160.

Bukit Besar, Nawngchik. 2,500 feet. One specimen.

This has the general outline of *S. Infula*, BENS., but the first five whorls have each a single well-marked spiral rib, while the last whorl has two.

There is a specimen of the same species (unnamed) in the British Museum, from Kelantan.

CHLORITIS, Beck.

14. Chloritis malayana (Mlldff.)

Helix (Trachia) malayana, *Mlldff. J. A. S. B.* lv, p. 303 (1886).
Chloritis malayana, *Mlldff. P.Z.S.* 1891, p. 335, pl. xxx, figs. 6, 6a.

Gedong, Batang Padang, South Perak.

This species was described by Dr. MOELLENDORFF, in 1886, as a *Trachia*, but later, in 1891, he removed it to the genus *Chloritis*, BECK. I must leave others, who are more conversant with the two genera, to decide as to which it belongs, but I should here like to point out the relationship, so far as the generative organs are evidence, between this species and *Trachia penangensis*, STOLICZKA.

The jaw is quadrant-shaped and exhibits twelve strong ribs, and one or two less distinct lateral ones. The radula is very similar to that of *T. Penangensis*, only the central tooth is larger, as also the laterals, and the basal plate smaller.

The Generative Organs (Pl. XII, fig. 17).

The vestibule is small and leads into a long wide vagina, distally, and on the right side the long receptaculum seminis opens into it; this organ is a thick muscular tube for the first two-thirds of its length, then follows a much thinner portion which terminates in a thin-walled sac, this latter is attached to the side of the common duct by a short muscle. The free-oviduct is very short and exhibits two well-marked constrictions, which divide it up into three bulbous portions. The common duct is richly folded on the oviducal side and of considerable width. The vas deferens is very long, and enters the penis on the right side of the latter organ, whose commencement is evident by the muscular sac-like head, from the end of which a small flagellum arises; the penis continues as a thin muscular tube for some distance, widening at the point where the retractor muscle is inserted, just beyond this there is a small caecal tube; the muscular wall is thickest about this region, beyond the penis gradually tapers to a very narrow tube. Internally its walls exhibit a series of well-marked plications and rugosities.

Compared with *Trachia penangensis*, Stol., the generative organs agree with those of that species in the general form of the male organ, excepting in the origin of the vas deferens, in the presence in both species of a caecal-like diverticulum of the penis, and a small flagellum at the distal end of that organ, and in the elongate receptaculum seminis and vagina.

15. Chloritis hardouini (De Morgan)

Helix hardouini, *De Morgan*, *Le Naturaliste*, 1885, p. 68.

Philidora hardouini, *De Morgan*, *Bull. Soc. Zool. Fr.* x, p. 37, pl. i, figs. 10a-10d (1885).

Chloritis hardouini, *Mlldff. P.Z.S.* 1891, p. 335.

Bukit Jalor, Jalor. 300 feet.

AMPHIDROMUS, Albers.

16. Amphidromus perakensis, Fult.

var. globosus, Fult., var. nov.

Biserat, Jalor.

'Common on tree trunks and on the leaves of wild bananas and gingerworts. Known to the Malays as the "moon-snail" (*siput bulan*).'

I am indebted to Mr. Hugh Fulton, who has made a special study of this genus, for very kindly examining and identifying these shells. He writes me that there is a certain amount of difference in the different shells. 'The columnellar lobe is as in *A. perakensis*, Fult.[1]; it is evidently closely allied to that species, only differing in form. It is figured by Pilsbry[2] as a form of *leucoxanthus*, which he considers a variety of *aureus*, Martyn. In my monograph I consider *leucoxanthus* as a variety of *perversus*, and I think the presence of a columnellar lobe in *perakensis*, and the present shells from Jalor, to be sufficient to separate them from *leucoxanthus*. I should propose calling your shells *perakensis*, var. or subspecies *globosus*.'

HAPALUS, Albers.

17. Hapalus jousseaumei, De Morgan

Hapalus jousseaumei, *De Morgan*, *Bull. Soc. Zool. Fr.* x, p. 24, pl. i, figs. 2a, 2c, (1885).

Bidor, Batang Padang, South Perak.

PROSOPEAS, Mörch.

18. Prosopeas tchehelense, De Morgan

Stenogyra tchehelensis, *De Morgan*, *Le Naturaliste*, 1885, p. 69; *id. Bull. Soc. Zool. Fr.* x, p. 40, pl. ii, figs. 7a, 7b (1885).

Telôm, Perak-Pahang boundary. 4,000 feet.

CLAUSILIA, Drap.

19. Clausilia penangense, Stol.

Clausilia (Phaedusa) penangensis, *Stol. J. A. S. B.* xlii, p. 27, pl. ii, figs. 4-6 and 15-17 (1873).

Bukit Besar, Nawngchik. 2,500 feet.

'Found on dead trees, feeding on fungi.'

20. Clausilia kelantanense, Sykes

Clausilia kelantanense, *Sykes*, *Journ. Malac.* ix, p. 22 and p. 61, pl. iii, fig. 1 (1902).

Bukit Besar, Nawngchik. 2,500 feet.

I have to thank Mr. E. R. Sykes for very kindly examining these shells, all of which, excepting one, he considers to be a variety of this species. He further informs me that the shells which he recorded from Kelantan as *C. filicostata*, STOL.,[1] are really very close to this variety, and that he was wrong in referring them to *C. filicostata*, having been misled by wrongly named shells.

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[1] *Journ. of Malac.*, 1901, viii, p. 194, pl. ix, figs. 8-10.

[2] *Tryon's Manual*, xiii, pl. 54, figs. 76, 77.

ATOPOS, Simr.

21. Atopos maximus, sp. nov.

(Pl. XI, Figs. 5, 6; Pl. XIII, Figs. 18-23)

Colour of the notum yellowish with slatey-blue mottling, and an irregular yellowish-brown band laterally, granulated, and minutely spotted with black, notum extends over the head in a hood-like manner; head white, facial region blue. Perinotum white; foot-sole (in alcohol) drab colour; keel distinct but not prominent.

Length of notum (in alcohol), 130 mm.; breadth, 24 mm.; height, 24 mm. Breadth of foot-sole, 12 mm. Female generative orifice about 20 mm. from the male generative orifice.

Bukit Besar, Nawngchik. 2,500 feet.

This is the largest and finest example of the genus I have seen, and my only regret is that more specimens were not met with. In life the animal is a slatey blue with a bright salmon-pink foot-sole. In all probability it is referable to the sub-genus *Padangia*, BABOR.

The Alimentary Canal (Pl. XIII, figs. 18-20).

The buccal cavity is large and may conveniently be divided into an anterior portion in front of the opening of the oesophagus, and a posterior portion behind the oesophageal opening. At the extreme posterior end there is a short stout muscle. The oesophagus passes from the dorsal side of the buccal cavity to the left, then making a short bend beneath the posterior portion of that organ it passes on the left side as a narrow tube into the substance of the 'liver' or mid-gut gland. At the point where the oesophagus opens into the cavity of the gland two other wide short ducts also open. Internally, the mid-gut gland is seen to be an irregular shaped cavity with a series of fine canals and irregular spaces, radiating from the main chamber. These are, perhaps, best seen in a series of transverse sections (Pl. XIII, Figs. 19, 20). The representation in Fig. 18 is purely diagrammatic. In this specimen the main chamber was perfectly empty, but amongst the contents of a smaller example I had no difficulty in identifying hyphae and spores of fungi, other vegetable matter, and particles of animal matter.

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[1] *Journ. Malac.* ix, p. 61 (1902).

The Sarasins in their well-known work on the land mollusca of the Celebes state that they did not meet with material such as described by SIMROTH, viz., fragments of fungi and flesh, 'substances which in the case of a robber slug like *Atopos* we should be very surprised to find.' In spite of this statement I think Dr. SIMROTH is correct as to the nature of the food. In *A. sarasini*, CLLGE., I had no difficulty in making out the contents, or in the above mentioned specimen of *A. maximus*.

Our knowledge of the habits of this interesting genus are peculiarly meagre. From the nature of the teeth of the radula one might suppose that the members of the genus lived, like the Testacellidae, beneath the surface, frequenting the burrows of earthworms, but from the preponderance of vegetable matter in the contents of the mid-gut gland, and from the fact that they have, I believe in all cases, been found among decaying vegetable matter, it would seem to point to the fact that they do not live beneath the surface to the same extent, if at all.

The Generative Organs (Pl. XIII, figs. 21, 22).

In general form the generative organs resemble those of *A. sarasini*, CLLGE., the female organs I was able to trace in some detail, but those of the male still remain a puzzle. Commencing as a simple wide tube the vagina receives, at its distal end, the duct of the receptaculum seminis, which latter body is a small spherical sac. Beyond this point the lumen of the tube widens and the wall thickens, here being thrown into a U-shaped fold, continuing as a much narrower tube it suddenly becomes thrown into a series of closely packed coils, which are partly imbedded in the large albumen gland. Passing from the end of the common duct is a short, fairly wide tube, which is connected with a large glandular body; clearly the homologue of the much smaller gland, which in *A. sarasini* I have termed the ovary. The penis is very like that in *A. sarasini* only longer and slightly different externally. The duct lies quite close to the wall of the sheath of the penis. I succeeded in tracing it to about the lower third of the right Simroth gland, where it seemed to terminate on the wall. Both the Simroth glands were well developed and exhibit the usual characters.

The Pedal Gland (Pl. XIII, fig. 23).

This is a large muscular looking organ, measuring 43 mm. in length, and 3 mm. in breadth anteriorly, and 5 mm. posteriorly.

'The Patani Malays confuse the slugs of this genus with the two species of *Eoperipatus* that were found in the Siamese Malay States by the "Skeat" Expedition, calling both *ulat chalawa*, though certain of the slugs are also called *ulat jelŏtong*, because their colour is supposed to resemble that of the monkey known as *lŏtong* (*Presbytes obscurus*). The confusion is to some extent justified by a certain resemblance in form, in the apparent texture of the integument, and in type of coloration, though the dorsal surface of the commoner species of the Molluscan genus is dark slatey blue, while that of the Peripati found in the Malay Peninsula is chocolate brown. The movements of the two genera, widely separated as are their organs of progression, are not so dissimilar to the eye, especially in the uncertain light of the jungle, as might be expected, and on one occasion I was quite deceived myself, exclaiming that we had found Peripatus at last on seeing *Atopos* moving, with some rapidity, across a jungle path in the early morning. Slugs of the genus under discussion are frequently found in the centre of rotten tree-trunks, in a dry, stiff, retracted, and apparently torpid condition, and though *Eoperipatus* is found in very much the same environment, the retraction of the molluscs' tentacles reduces their resemblance to the Arthropod to a minimum. Both Peripatus and slugs resembling it are said by the Malays to be so poisonous that if a drop of their slime, which is very scanty in the latter, and is, of course, ejaculated from certain large glands in the former, falls on a man's limb it will cause it to rot off. The slugs are sometimes calcined and their ashes rubbed on the horns of fighting bulls, under the belief that even a scratch from a horn so treated will cause the bull's opponent to fall down dead.' N.A.

The distribution of *Atopos* in the Malay Peninsula seems very anomalous. The genus was originally described from the Philippines, and species referred to it are also known from Amboina, Celebes, West Sumatra, and Cochin China, while several species beside the present one have been described from the Eastern Malay States.[1] But curiously enough, with the exception of one from Penang (and this locality, like that of 'Malacca,' often covers a very wide area, indeed), no species has ever been met with on the western side of the Peninsula. The State of Perak has been fairly well explored by malacologists, and if they existed it is highly improbable that such large and conspicuous forms as the species of *Atopos* are would have escaped notice. I searched for them myself in environments precisely similar to those in which they were found on Bukit Besar, but in every case without success.

A parallel instance may be mentioned among birds, for the barbet, *Thereiceryx lineata* (Viell), is known from the Burmese countries, Siam, Cochin China, Patani, and Pahang, reappearing in Java, but has never been met with on the western side of the Peninsula.—H. C. R.

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[1] Collinge, *Journ Malac.*, IX, p. 87 *et seq.* (1902). The genus has recently been found in North-west Borneo. See *Journ. Malac.* X, p. 82 (1903). W. E. C.

VERONICELLA, Blainv.

22. Veronicella, sp.

(Pl. XI, Figs. 7, 8)

Animal yellowish-white or creamy yellow dorsally, with minute black speckles and a medio-dorsal yellowish-white stripe. Hyponotum same colour; foot-sole a dirty yellow, marked by fine, closely set, transverse lines.

Length (in alcohol), 45 mm.; foot-sole, 5·5 mm. broad; hyponotum, 7 mm. broad. Female generative orifice on the right side, 3 mm. from the foot-sole; 20 mm. from the right lower tentacle; and 21·5 mm. from the posterior end of the body.

Bukit Besar, Nawngchik. 2,500 feet.

23. Veronicella, sp.

(Pl. XI, Figs. 9, 10)

Animal yellowish-brown with faint, minute, sepia coloured speckles, and a few black blotches, a narrow medio-dorsal stripe. Hyponotum same colour with a few sepia coloured blotches; foot-sole a darker brown marked by fine, closely set, transverse lines.

Length (in alcohol), 42·5 mm.; foot-sole, 5 mm. broad; hyponotum, 8·5 mm. broad. Female generative orifice on the right side, 2·5 mm. from the foot-sole; about 17·5 mm. from the right lower tentacle; and 2·5 mm. from the posterior end of the body.

Gedong, Batang Padang, South Perak.

Having only a single example of each of these species I have thought it undesirable to name them until more material may be examined.

REFERENCE LETTERS

alb. gl.	Albumen gland.
b. c.	Buccal cavity.
c.	Caecal cavity.
cav.	Cavity of digestive gland.
d. gl.	Dart gland.
d. s.	Dart-sac.
di. gl.	Digestive gland.
ep.	Epiphallus.
fl.	Flagellum.
f. ov.	Free-oviduct.
h. d.	Hermaphrodite duct.
h. gl.	Hermaphrodite gland.
k. s.	Kalk sac.
L. S. gl.	Left Simroth gland.
o.	Ovary.
oe.	Oesophagus.
ov.	Oviduct.
p.	Penis.
pr.	Prostate.
R. S. gl.	Right Simroth gland.
r.	Rectum.
r. d.	Receptacular duct.
r. m.	Retractor muscle.
r. s.	Receptaculum seminis.
s. d.	Salivary duct.
s. gl.	Salivary gland.
v.	Vestibule.
vg.	Vagina.
v. d.	Vas deferens.
w. d. s.	Wall of dart sac.
♀.	Female generative orifice.

EXPLANATION OF PLATES

Fig. 1.	*Damayantia minima*, sp. nov.	Right lateral view. x 2.
Fig. 2.	„ „	Dorsal view. x 2.
Fig. 3.	*Parmarion malayana*, sp. nov.	Right lateral view. x 1½.
Fig. 4.	„ „	Dorsal view. x 1½.
Fig. 5.	*Atopos maximus*, sp. nov.	Right lateral view. x 1.
Fig. 6.	„ „	Ventral view. x 1.
Fig. 7.	*Veronicella*, sp.	Dorsal view. x 1.
Fig. 8.	„	Ventral view. x 1.
Fig. 9.	*Veronicella*, sp.	Dorsal view. x 1.
Fig. 10.	„	Ventral view. x 1.
Fig. 11.	*Parmarion malayana*, sp. nov.	Generative organs, enlarged.
Fig. 12.	„ „	„ „ „
Fig. 13.	„ „	Dart. x 17.
Fig. 14.	*Nilgiria lowi* (De Morgan).	Generative organs, enlarged.
Fig. 15.	„ „	The dart-sac dissected to show the muscular papilla.
Fig. 16.	„ „	Cap-like terminal portion of the penis.
Fig. 17.	*Chloritis malayana* (Mlldff.).	Generative organs, enlarged.
Fig. 18.	*Atopos maximus*, sp. nov.	Alimentary canal showing in a semi-diagrammatic manner the digestive or mid-gut gland.
Fig. 19.	„ „	Transverse section of the anterior part of digestive gland.
Fig. 20.	„ „	Transverse section of the posterior part of digestive gland.
Fig. 21.	„ „	The male generative organs and Simroth glands.
Fig. 22.	„ „	The female generative organs.
Fig. 23.	„ „	The Pedal gland. x 2.

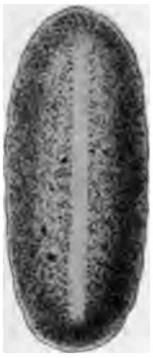


Fig. 7.

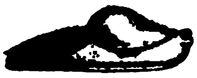


Fig. 1.

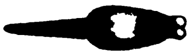


Fig. 2.

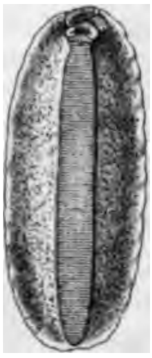


Fig. 8.

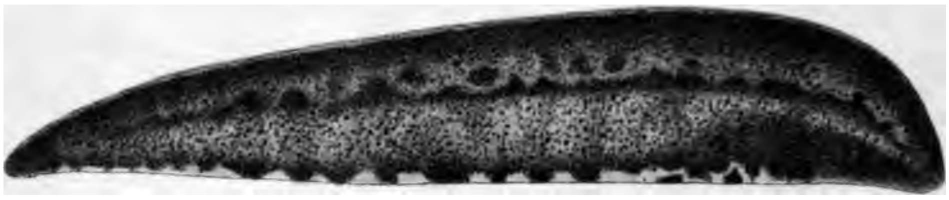


Fig. 5.

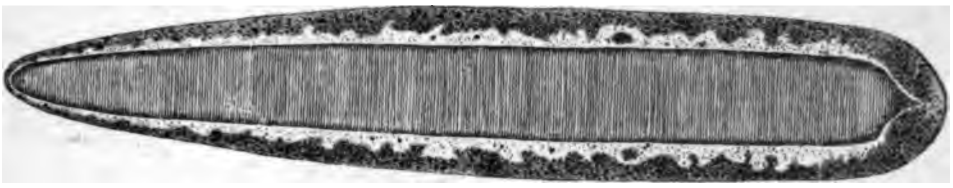


Fig. 6.

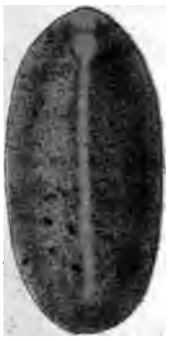


Fig. 9.

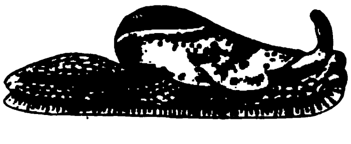


Fig. 3.

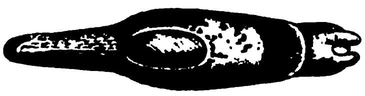


Fig. 4.

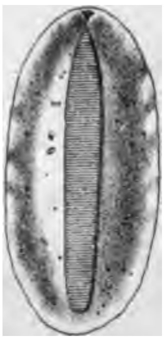


Fig. 10.

ker. del et pinxt ad nat.

T.N. Latham. lith.

MOLLUSCA.

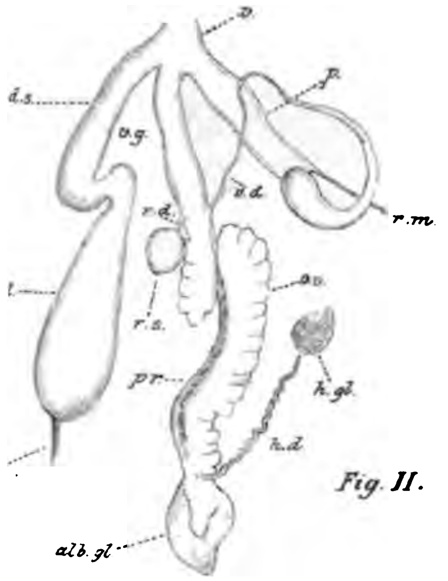


Fig. 11.

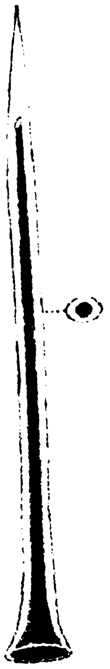


Fig. 13.

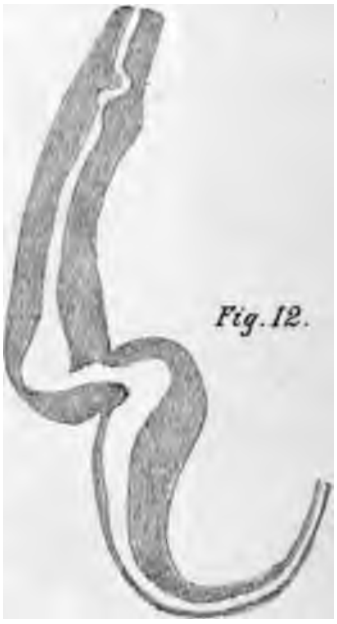


Fig. 12.

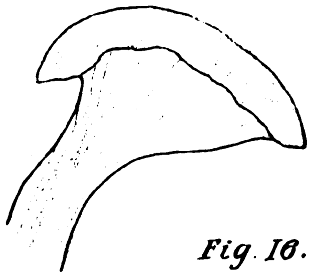


Fig. 16.

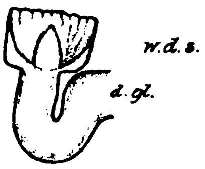


Fig. 15.

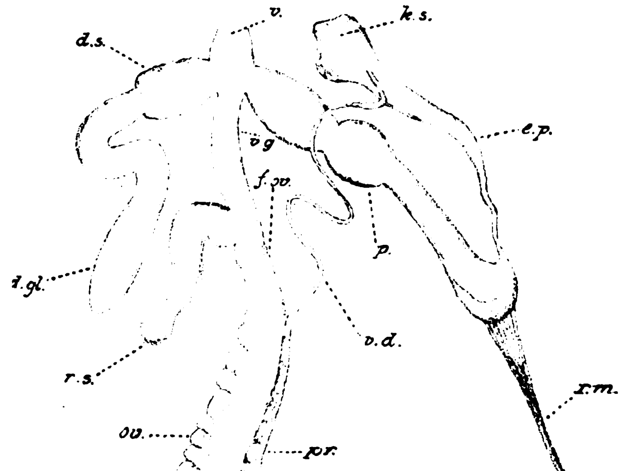


Fig. 14.

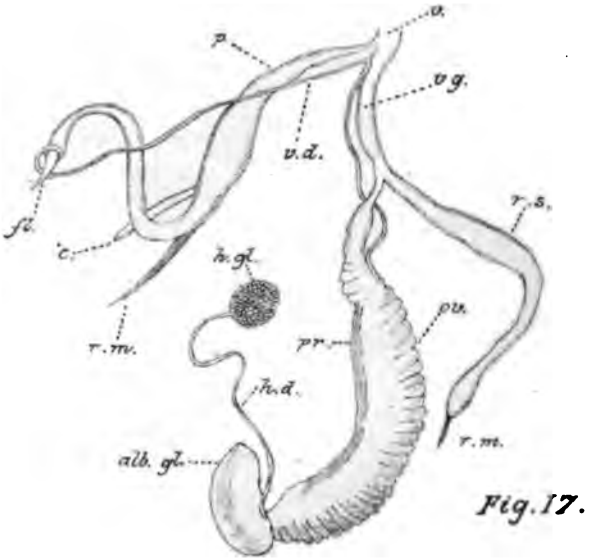


Fig. 17.

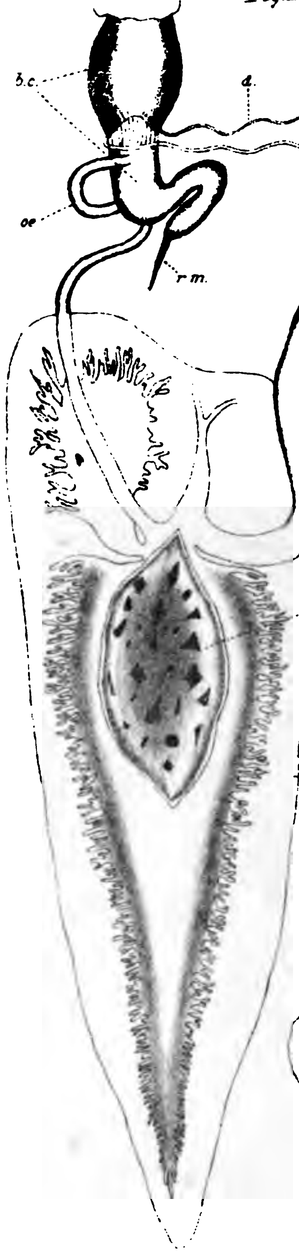
W. E. C. del. ad nat.

T. N. Latham, Lith.

MOLLUSCA.

PLATE XIII.

Fig. 18.



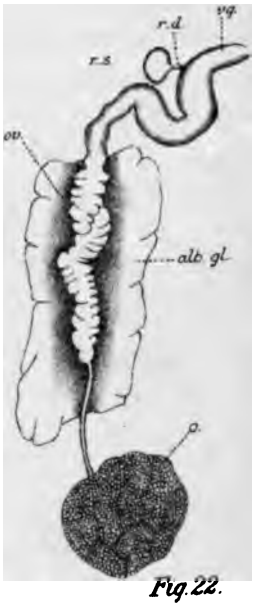


Fig. 22.

Fig. 23.

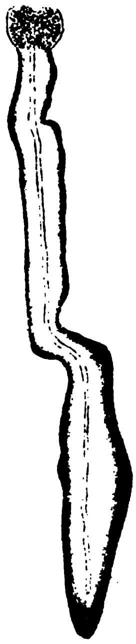


Fig. 19.

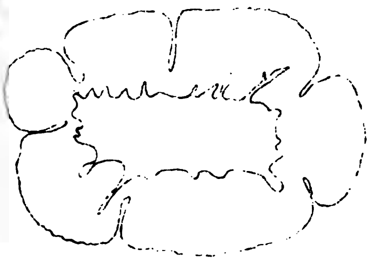
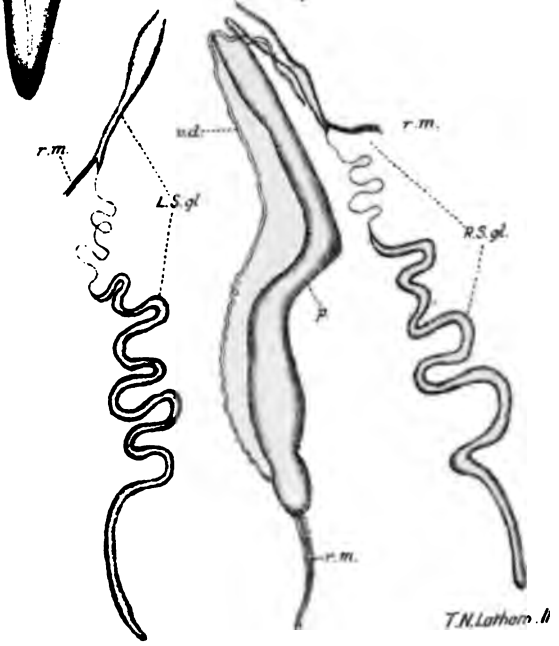


Fig 21.



T.N.Latham. lith.

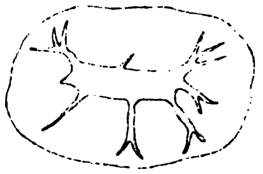


Fig. 20.

W.E.C. del. ad nat.

ANATOMY OF ATOPOS MAXIMUS, sp. nov.

REPORT ON THE RHYNCHOTA

PART I. HETEROPTERA

BY W. L. DISTANT

INTRODUCTORY NOTE

THE majority of the specimens recorded in the present paper are from the Patani States, but some are from Perak and a few, for which Mr. Robinson is solely responsible, from Selangor. Mr. Distant remarks that a peculiarity of the collection is the poor representation of conspicuous forms. This is due to no scheme of the collectors, for we took all that we saw or that fell into our sweep-nets ; but it may be due, at any rate in part, to the fact that the nine months we spent in the Patani States were very dry and to the subsequent disappearance of the larger species, as the 'Skeat' collection, which was obtained in the same district in a very much wetter year, is particularly rich in conspicuous forms.

Another point of interest, not fully brought out in the paper, is the number of Heteroptera which resemble ants in appearance and movements. Unfortunately, the majority of such forms are immature, and Mr. Distant prefers not to express an opinion as to their identity ; some of them will be mentioned again in the notes added to Colonel Bingham's Report on the Aculeate Hymenoptera, which is unavoidably postponed for the present.

Mr. Robinson is mainly responsible for the editing of the report on the Heteroptera, but his departure for Malaya, to take up the curatorship of the State Museum at Kuala Lumpur, has obliged me to write this note.

NELSON ANNANDALE

REPORT ON THE RHYNCHOTA

PART I. HETEROPTERA

BY W. L. DISTANT

THIS very interesting collection of *Rhynchota*, made by Messrs. ANNANDALE and ROBINSON during their expedition to the Siamese Malay States and Perak, is remarkable under two aspects—firstly, by e absence of many well-known and common species; and secondly, by the esence of a large number of small, obscure, and little-known species. wing to the first cause there is not sufficient material to enable any general nclusions to be formed on the geographical distribution of the *Rhynchota* und in this fauna; but, by its other character, I have been able to describe d figure a considerable number of new species and some new genera. A st set of all the specimens has been presented to the British Museum, and nsequently the types representing the new diagnoses are to be found in the ational Collection.

The *Hemoptera* will form the subject of a second Report.

HETEROPTERA

PENTATOMIDAE

PLATASPINAE

1. Brachyplatys burmeisteri

achyplatys burmeisteri, *Distant*, *Ann. Mag. Nat. Hist.* (5) iii, p. 46 (1879); *id. Faun. Brit. Ind. Rhynch.* i, p. 12 (1902).
hyreocoris silphoides, *Burm.* (nec *Fabr.*) *Handb.* ii, p. 384, 3 (1835).

Bukit Besar, Nawngchik. 2,500 feet. 3rd September, 1901.

'From interior of trunk of dead palm tree.'

Common in Assam and also found in Java.

2. Coptosoma cribrarium

Cimex cribraria, *Fabr. Ent. Syst. Suppl.*, p. 531 (1798).
Tetyra cribraria, *Fabr. Syst. Rhyng.*, p. 143 (1803).
Thyreocoris cribraria, *Burm. handb.* ii (1), p. 384 (1825).
Coptosoma cribrarium, *Amy. and Serv. Hem.*, p. 66, t. 2, f. 4 (1843); *Stål., En. Hem.* v, p. 12 (1876); *Atkins. J.A.S.B.* lvi, p. 31 (1887); *Hist. Faun. Brit. Ind. Rhynch.* i, p. 22, fig. 11 (1902).
Coptosoma atomarium, pt. *Voll. Ind. Néerl.*, p. 50 (1863).
Coptosoma xanthochlora, *Walker, Cat. Het.* i, p. 87 (1867).

Bukit Besar, Nawngchik. 2,500 feet.

Found throughout British India and also received from China and Formosa.

3. Coptosoma duodecimpunctatum

Thyreocoris duodecimpunctatum, *Germ. Zeitschr.* i, p. 30 (1839); *Herr.-Schäff. Wanz. Ins.* v, p. 14, t. 150, f. 474 (1839).
Coptosoma duodecimpunctatum, *Dall. List Hém.* i, p. 62 (1851); *Stål. En. Hem.* v, p. 10 (1876); *Atkins. J.A.S.B.* lvi, p. 30 (1887); *Hist. Faun. Brit. Ind. Rhynch.* i, p. 19 (1902).

Ban Sai Kau, Nawngchik.
Biserat, Jalor. 8th July, 1901.

'At Biserat this species was found in considerable numbers on the shoots of a species of acacia with honey glands growing in the open. When disturbed the head was folded beneath the thorax, and the insect attempted to fall to the ground. If prevented from doing this it readily took to flight.'

Found throughout British India and the Malay Peninsula.

4. Coptosoma pulchellum

Coptosoma pulchellum, *Montand. Ann. Mus. Civ. Gen.* xxxiv, p. 136 (1894); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 28 (1902); *Vars.*, distinctum, omnimundum, impeditum, *Montand. Ann. Soc, Ent. Belg.* xl, pp. 118-119 (1896).

Sungkei, South Perak. February, 1902.

Found throughout British India and also recorded from Java and China.

5. Coptosoma siamicum

Coptosoma siamicum, *Walk.*, *Cat. Het.* i, p. 89, 39 (1867); *Dist. Ann. Mag. Nat. Hist.* (7) viii, p. 240 (1901); *id. Faun. Brit. Ind. Rhynch.* i, p. 30 (1902).
Coptosoma concinnula, bellula, *and* inclusa, *Walker*, *loc. cit.*, pp. 94, 95.
Coptosoma saundersii, *Leth. and Sev. Cat. Gén. Hém.* t. i, p. 9 (1893).
Coptosoma sphaerula, pt. *Leth. and Sev. loc. cit.*, p. 9.
Coptosoma minima, *Atkins*, *J.A.S.B.* lvii, p. 342 (1889); *Kulg. Arch. f. Naturg.* 1901, p. 224.
Coptosoma pygmaeum, *Montand. Ann. Soc. Ent. Belg.* xl, p. 120 (1896); *Kulg. Arch. f. Naturg.*, 1901, p. 221.
Var.—
Coptosoma orbicula *and* blandula, *Walk.*, *Cat. Het.* i, pp. 91, 96 (1867).
Coptosoma pygmaeum *var.* accensitum, *Montand. Ann. Soc. Ent. Belg.* xl, p. 447 (1896).

Biserat, Jalor.

Found throughout British India, and received from various islands of the Malayan Archipelago; also recorded from N. Australia.

6. Tropidotylus annandalei, sp. nov.

(Plate XV)

Above dark castaneous, speckled with ochraceous; head with the anterior areas of the lateral lobes, a spot at base, and another at inner margins of eyes, ochraceous; antennae ochraceous, apex of second joint and the whole of the third joint piceous, remainder multilated; sternum greyish brown; abdomen beneath castaneous, its disk piceous; head beneath, rostrum, legs, and lateral margins of abdomen ochraceous; apex of rostrum piceous. Above punctate and faintly rugulose; head moderately long, margins convex, the central lobe very prominent and gibbous; second and third joints of antennae subequal in length; scutellum with the sub-basal transverse impression moderately well defined; lateral ochraceous margins of the abdomen inwardly broadly, obtusely angulate, each angle with a small castaneous spot.

Long 7 mm.; max. lat. 5½ mm.

Bukit Besar, Nawngchik. 2,500 feet. 30th August, 1901.

'In nest of small black ants, under leaf of a climbing ficus. It was surrounded by the ants, which appeared to be obtaining food from it.' N.A.

SCUTELLERINAE

Elvisuraria

7. Solenostethium rubropunctatum

Scutellera rubropunctata, *Guér. Voy. Coq. Zool.* ii, p. 157 (1830).

Solenostethium rubropunctatum, *Dall. List Hem.* i, p. 7 (1851); *Atkins. J.A.S.B.* lvi, p. 147 (1887); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 40, fig. 16 (1902).

Biserat, Jalor. 18th October, 1901.

Found throughout British India and also in Cambodia.

Scutelleraria

8. Calliphara nobilis

Cimex nobilis, *Linn. Cent. Ins.*, p. 17, 46 (1763); *id. Amoen.* 6, p. 400, 46 (1763).

Callidea nobilis, *Dall. List. Hem.* i, p. 32 (1851).

Calliphara nobilis, *Stål. En. Hem.* iii, p. 17 (1873); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 53, fig. 23 (1902).

Cimex pustulatus, *Panz. in Voet. Col.* iv, p. 111, 11, pl. 47, f. 11 (1798).

Scutellera buquetii, *Guér. Voy. Coq. Ins.*, pp. 159 and 162 (1830).

Biserat, Jalor. 21st October, 1901.

'From low shrubs in secondary jungle at base of limestone cliff.'

Found throughout Burma and Tenasserim, widely distributed in the Malayan Archipelago, and received from Hongkong and Formosa.

9. Chrysocoris grandis

Cimex grandis, *Thunb. Nov. Ins. Sp.* ii, p. 31, t. 2, f. 46 (1783).

Calliphara grandis, *Germ. Zeitschr.* i, p. 128, 13 (1839).

Callidea grandis, *Dall. List Hem.* i, p. 23 (1851).

Chrysocoris (Eucorysses) grandis, *Stål. En. Hem.* iii, p. 18 (1873).

Chrysocoris grandis, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 54 (1902).

Eucorysses superbus, *Uhler, Proc. Acad. Nat. Sci. Philad.*, 1860, p. 221.

Callidea distinguenda, *Uhler, loc. cit.*, 1861, p. 286.

Var. a—

Cimex baro, *Fabr. Ent. Syst. Suppl.*, p. 528, 7-8 (1798).

Tetyra baro, *Fabr. Syst. Rhyng.*, p. 129, 3 (1803).

Calliphara baro, *Germ. Zeitschr.* i, p. 127, 11 (1839)
Callidea baro, *Dall. List Hem.* i, p. 22, 3 (1851).
Tetrarthria tetraspila, *Walk. Cat. Het.* i, p. 19, 3 (1867).
Var. b—
Eucorysses pallens, *Amy. and Serv. Hém.*, p. 31, 1, pl. i, f. 4 (1843).
Callidea baro, *Voll. Faun. Ind. Néerl.* i, p. 17, 3 (1863).

Bukit Besar, Nawngchik. 28th August, 1901.

'On the upper surface of the leaves of zingiberaceous plants.'

Found throughout British India and in China and Japan. The three specimens collected by Messrs. ANNANDALE and ROBINSON agree with the typical form of the species.

10. Chrysocoris stollii

Cimex stollii, *Wolff. Ic. Cim.* ii, p. 48, f. 45 (1801).
Callidea stollii, *Germ. Zeitschr.* i, p. 114, 7 (1839).
Chrysocoris stollii, *Stål. Hem. Fabr.* i, p. 11, 8 (1868); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 58 (1902).
Scutellera stockerus, *Guér. Voy. Coq. Ins.*, p. 159, 5 and p. 161 (1830).
Callidea porphyricola, *Walk. Cat. Het.* i, p. 29, 19 (1867).

Ban Sai Kau, Nawngchik. 21st May, 1901.
Biserat, Jalor. 4th July, 1901.

'Among long grass at the edge of jungle.'

Found throughout British India and recorded from Formosa and N. China.

11. Chrysocoris ornatus

Callidea ornata, *Dall. List Hem.* i, p. 27 (1851).
Chrysocoris ornatus, *Stål. En. Hem.* iii, p. 21, 19 (1873); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 59 (1902).

Bukit Besar, Nawngchik. 2,500 feet. April and May, 1901.

Also recorded from Assam and China.

12. Chrysocoris eques

Cimex eques, *Fabr. Ent. Syst.* iv, p. 79, 2 (1794).
Tetyra eques, *Fabr. Syst. Rhyng.*, p. 131, 13 (1803).
Scutellera eques, *Guér. Voy. Coq. Zool.*, p. 158, 3 (1830).
Callidea eques, *Burm. Handb.* ii (1), p. 394, 1 (1835); *Dall. List Hem.* i, p. 28 (1851).

Galostha eques, *Amy. and Serv. Hém.*, p. 33, 1 (1843).

Chrysocoris eques, *Stål. Hem. Fabr.* i, p. 11, 3 and p. 12, 12 (1868); *Atkins. J.A.S.B.* lvi, p. 179 (1887); *Hist. Faun. Brit. Ind. Rhynch.* i, p. 61 (1900).

Var. a—

Callidea schwaneri, *Voll. Faun. Ind. Néerl.* i, p. 26, 18, pl. 2, fig. 7 (1863).

Var. b—

Var. nicobarensis, *Atkins. Proc. A.S.B.*, 1887, p. 13.

Var. c—

Callidea formosa, *Westw. in Hope Cat. Hem.* i, p. 15 (1837).

Callidea dorsalis, *White in Gray's Zool. Misc.*, p. 80 (1842).

Bukit Besar, Nawngchik.	2,500 feet.	May,
Biserat, Jalor.		July and October, 1901.

'From low shrub in secondary jungle at base of limestone cliff.'

Found throughout British India, and also in some of its varietal forms recorded from Java, Borneo, and China.

13. Graptophora reynaudi

Scutellera reynaudi, *Guér. Voy. Belang. Zool.*, p. 497, *Ins.* pl. iv, f. 3 (1834); *Germ. Zeitschr.* i, p. 136, 9 (1839).

Callidea reynaudi, *Dall. List Hem.* i, p. 27 (1851); *Voll. Faun. Ind. Néerl.* i, p. 22 (1863).

Callidea pulchra, *Westw. in Hope Cat.* i, p. 16 (1837).

Calliphara pulchra, *Germ. Zeitschr.* i, p. 127, 10 (1839).

Bukit Besar, Nawngchik.	2,500 feet.	12th May, 1901.
Mabek, Jalor.		25th July, 1901.

Also recorded from several islands of the Malayan Archipelago.

Tetyraria

14. Hotea curculionoides

Pachycoris curculionoides, *Herr.-Schäff. Wanz. Ins.* iii, p. 106, f. 331 (1835).

Hotea curculionoides, *Dall. List Hem.* i, p. 39 (1851); *Stål. En. Hem.* iii, p. 25 (1873); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 65 (1902).

Pachycoris punctulatus, *Germ. Zeitschr.* i, p. 105, 48 (1839).

Hotea nasuta, *Walk. Cat. Het.* i, p. 58, 9 (1867).

Biserat, Jalor. 3rd to 5th July, 1901. (At light).

Widely distributed; found throughout British India, the Malayan Archipelago, and recorded from China.

'The resemblance between this bug and a species of weevil, which attacks the fruit of various mangos, is remarkable, and we have also taken the two species in the same environment, viz., among brushwood in the open; but both are inconspicuously coloured, resembling bark.'

GRAPHOSOMATINAE

15. Podops coarctata

Cimex coarctata, *Fabr. Ent. Syst. Suppl.*, p. 530, 44-5 (1798).
Scotinophora coarctata, *Stål. Hem. Fabr.* i, p. 21, 2 (1868).
Podops coarctata, *Hist. Faun. Brit. Ind. Rhynch.* i, p. 73, fig. 36 (1902).
Tetyra bispinosa, (pt.) *Fabr. Syst. Rhyng.*, p. 138, 48 (1803).
Podops spinosus, nasalis, and exacta, *Walk. Cat. Het.* i, pp. 73, 74 (1867).

Kuala Lumpur, Selangor. 23rd April, 1902. (At light).

Found nearly throughout British India, common in the Malay Peninsula and recorded from Java.

16. Podops malayensis, sp. nov.

(Plate XV)

Piceous-brown; head, anterior area of pronotum, and sternum, greyishly pilose; antennae, ochraceous, apical joint, excluding base, piceous; femora black, tibiae and tarsi stramineous; anterior and intermediate tibiae with their bases piceous, their apices pale castaneous; rostrum brownish, its apex piceous and reaching the posterior coxae; scutellum with a luteous spot near each basal angle; lateral margins of abdomen with small obscure ochraceous spots; stigmata piceous; first and second joints of antennae shortest and subequal in length, third, fourth, and fifth joints almost subequal; anterior pronotal angles ochraceous and horizontally extended; lateral margins concavely sinuate, lateral angles prominently obtusely spinous; abdominal segments laterally posteriorly obtusely spinous.

Length 6 to 6½; exp. pronot. angl. 3½ mm.

Bidor, South Perak. February, 1901. (At light).
Sungkei, South Perak. February, 1902. (At light).

17. Aspidestrophus lineola

Aspidestrophus lineola, *Voll. Faun. Ind. Néerl.* i, p. 44, 2, pl. III, f. 10 (1863); *Hist. Faun. Brit. Ind. Rhynch.* i, p. 80, fig. 40 (1902).

Bukit Besar, Nawngchik. 2,500 feet. 2nd September, 1901.

Also recorded from Assam, Burma, and S.E. Borneo.

'In white-flowered shrub in secondary jungle, along with a very large number of other insects.'

Described from Burma.

24. Eusarcocoris guttiger

Cimex guttiger, *Thunb. Nov. Ins. Sp.* ii, p. 32, t. 2, f. 47 (1783).
Stollia guttigera, *Stål. En. Hem.* v, p. 81 (1876).
Eysarcoris guttigerus, *Dall. List. Hem.* i, p. 228 (1851).
Eusarcocoris, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 165 (1902).
Pentatoma nepalensis and punctipes, *Westw. in Hope Cat.* i, p. 36 (1837).

Biserat, Jalor. 5th July, 1901. (At light).

Found throughout British India, reported from China, common in Japan.

25. Eusarcocoris aenescens

Hoplistodera aenescens, *Walk. Cat. Het.* ii, p. 266 (1867).
Eusarcocoris aenescens, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 166 (1902).

Bukit Besar, Nawngchik. 2,500 feet.
Mabek, Jalor. 27th July, 1901.

Also recorded from Tenasserim and found in Borneo.

26. Carbula trabifera

Carbula trabifera, *Bredd. Stett. Ent. Zeit.*, 1890, p. 302.

Bukit Besar, Nawngchik. 2,500 feet.
Telôm, Perak-Pahang border. 4,000 feet. January, 1902.

Described from Sumatra.

Hoplistoderaria

27. Paracritheus trimaculatus

Scutellera trimaculatus, *Lep. and Serv. Enc. Meth.* x, p. 411 (1825).
Graphosoma trimaculatus, *Germ. Zeitschr.* i, p. 54 (1839).
Hoplistodera trimaculata, *Dall. List Hem.* i, p. 217 (1851).
Astyanax trimaculatus, *Stål. Öfv. Vet.-Ak. Förh.*, 1870, p. 629.
Paracritheus trimaculatus, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 178 (1902).

Biserat, Jalor. 19th October, 1901.

Common in the Malay Peninsula, and found in many islands of the Malayan Archipelago.

28. Stachyomia luteovaria, sp. nov.

(Pl. XV)

Head luteous with somewhat variable short longitudinal fuscous lines; antennae luteous, apical joint brownish-ochraceous; pronotum pale brownish, coarsely darkly punctate, its lateral margins angulately prolonged interiorly, a large subquadrate spot at anterior margin and some transverse broken waved markings across central disc, pale levigate luteous; scutellum luteous with scattered patches of fuscous punctures, principally at base and lateral areas, those on disk being few and detached; corium obscure luteous, sparingly darkly punctate; membrane hyaline; connexivium luteous with fuscous spots; body beneath and legs pale luteous; lateral margins of prosternum, a central spot to each sternal segment, some spots at lateral margins of mesosternum, a double series of spots on lateral abdominal areas and a central spot to apical abdominal segment, pale castaneous. Pronotum with the lateral spines strongly acutely laterally produced; lateral spines to the apical abdominal segment strongly produced.

Length, 6 mm.; exp. pronot. angl., 6 mm.

Jalor, Biserat. 17th October, 1901.

'On same shrub as *Sepontia variolosa*.'

Antestiaria

29. Antestia anchora

Cimex anchora, *Thunb. Nov. Ins. Sp.* ii, p. 47, t. 2, fig. 60 (1783).
Pentatoma anchora, *Dall. List Hem.* i, p. 254 (1851).
Antestia anchora, *Stål. En. Hem.* v, p. 96 (1876); *Dist. Faun. Brit. Ind. Rhynch* i, p. 183, fig. 110 (1902).
Pentatoma cruciata, *Ellenr. Nat. Tijdschr. Nederl. Ind.* xxiv, p. 154 (1862).
Strachia pardalis and platyspila, *Walk. Cat. Het.* ii, pp. 330, 337 (1867).
Antestia ellenriederi, *Bredd. Stett. Ent. Zeit.*, 1900, p. 322.

Mabek, Jalor. 26th July, 1901.

'On wing in thick jungle.'

Found throughout Northern India, Burma, Tenasserim, and the Malay Peninsula; also recorded from Java and Sumatra.

30. Plautia fimbriata

Cimex fimbriata, *Fabr. Mant. Ins.* ii, p. 295 (1787).
Pentatoma fimbriata, *Dall. List. Hem.* i, p. 251 (1851).

Plautia fimbriata, *Stål. Hem. Afr.* i, p. 191 (1864); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 181, fig. 108 (1902).
Pentatoma fimbriolatum, *Herr-Schäff. Wanz. Ins.* vii, p. 102, fig. 768 (1844).
Pentatoma crossota, *Dall. List. Hem.* i, p. 252 (1851).
Rhaphigaster rufoviridis, *Walk. Cat. Het.* ii, p. 364 (1867).

Jalor, Biserat.

Common throughout the Oriental region, and found in Madagascar.

'From bushes on waste ground.'

Eurydemaria

31. Agonoscelis nubila

Cimex nubila, *Fabr. Syst. Ent.*, p. 712 (1775).
Halys nubila, *Fabr. Syst. Rhyng.*, p. 183 (1803).
Aelia (?) nubila, *Hahn. Wanz. Ins.* iii, p. 29, t. lxxxii, fig. 251 (1835).
Agonoscelis nubila, *Dall. List Hem.* i, p. 179 (1851); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 189 (1902).
Pentatoma grata, *Palis. de Beauv. Ins.*, p. 129; *Hém.* t. ix, fig. 5 (1805).
Agonoscelis indica, *Spin. Ess.*, p. 329 (1837).
Aelia crucifera, *Westw. in Hope Cat.* i, p. 32 (1837).
Nevroscia sulciventris, *Ellenr. Nat. Tijdschr. Nederl. Ind.* xxiv, p. 144, pl. ii, fig. 11 (1862).

Jalor; Mabek, Biserat. 11th June, 1901.

'On low vegetation on waste ground.'

Throughout British India, Malay Peninsula, several islands of the Malayan Archipelago, and recorded from China and Japan.

32. Cinxia limbata

Cimex limbatus, *Fabr. Syst. Rhyng.*, p. 176 (1803).
Strachia limbata, *Amy. and Serv. Hém.*, p. 127 (1843).
Cinxia limbata, *Stål. Hem. Fabr.* i, p. 30 (1868); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 195, fig. 117 (1902).

Nawngchik, Bukit Besar.

Common throughout the northern regions of India, and found in Burma, Tenasserim, and the Malay Peninsula. Recorded from Java and Sumatra.

Bukit Besar, Nawngchik. 2,500 feet. 29th April and 3rd May, 1901.

33. Stenozygum speciosum

Strachia speciosa, *Dall. List Hem.* i, p. 261 (1851).

Stenozygum speciosum, *Stål. En. Hem.* v, p. 86 (1879); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 193, fig. 115 (1902).

Strachia inornata, *Walk. Cat. Het.* ii, p. 331 (1867).

Biserat

Somewhat common throughout British India.

Nezaria

34. Catacanthus incarnatus

Cimex incarnatus, *Dru. Ill.* ii, p. 67, pl. xxxvi, fig. 5 (1773).

Catacanthus incarnatus, *Dall. List Hem.* i, p. 270 (1851); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 218, fig. 138 (1902).

Cimex nigripes, *Fabr. Syst. Ent.*, p. 710 (1775).

Edessa nigripes, *Fabr. Syst. Rhyng.*, p. 149 (1803).

Cimex melanopus, *Gmel. Syst. Nat.* i (4), p. 2149 (1788).

Cimex aurantius, *Sulz. Gesch. Ins.*, p. 96, t. x, fig. 10 (1776).

Pentatoma aurantiacum, *Blanch. Dist. des Ins.* iii, p. 29; *Hem.* t. vi, fig. 4 (1840-41).

Jalor; Mabek, Biserat.

Found throughout British India, extensively distributed in the Malayan Archipelago, and reported from Japan and Corea.

35. Nezara viridula

Cimex viridulus, *Linn. Syst. Nat. ed.* x, p. 444 (1758).

Nezara viridula, *Stål. Hem. Afr.* i, p. 193 (1864); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 220, fig. 139 (1902).

Cimex smaragdula, *Fabr. Syst. Ent.*, p. 711 (1775).

Cimex torquatus, *Fabr. Syst. Ent.*, p. 710 (1775).

Pentatoma flavicollis and flavicornis, *Palis. de Beauv. Ins. Hem.*, p. 185, t. xi, fig. 4 (1805).

Pentatoma unicolor, oblonga, subsericea, leii, tripunctigera, proxima, chinensis, berylina, *West. in Hope Cat.* i, pp. 37, 38 (1837).

Pentatoma plicaticollis, *Lucas, Explr. Alger. Ins.*, p. 87; *Hém.*, t. 111, fig. 9 (1849).

Pentatoma vicaria, *Walk. Cat. Het.* ii, p. 303 (1867).

For further synonymy, *cf. Dist. Biol. Centr. Amer. Rhynch.* i, p. 78 (1880).

Ban Sai Kau, Nawngchik.	20th May, 1901.
Biserat, Jalor.	30th June, 1901.
Biserat, Jalor.	12th July, 1901.

Almost universally distributed.

'This species was commonly found on the leaves and inflorescence of a tall, yellow, leguminous herb, and dropped to the ground very readily when disturbed.'

Menidaria

36. Paterculus conspersus, sp. nov.

(Pl. XV)

Ochraceous, thickly covered with coarse piceous punctures; antennae, extreme lateral margins of head, pronotum, basal area of corium and connexivium, central lobe of head, a spot at inner margin of each eye, two discal spots on anterior area of pronotum, three small spots at basal margin and a linear spot on each side of apex of scutellum, body beneath rostrum and legs, luteous or pale ochraceous; fourth and fifth joints of antennae excluding bases, eyes, a subobsolete central transverse fascia to pronotum, inner area of connexivum, irregular punctures to sternum, a broad irregular sublateral abdominal fascia, disks of sixth and anal abdominal segments, and small spots to legs, fuscous or brown; second and third joints of antennae almost subequal in length, fourth and fifth longest and also subequal; lateral margins of head convex and distinctly reflexed, membrane bronzy, shining.

Length, 9 mm.; exp. pronot. angl., 5½ mm.

Biserat, Jalor.

Euryaspisaria

37. Brachycoris insignis

Brachycoris insignis, *Dist. Ann. Mag. Nat. Hist.* (7) v, p. 420 (1900); *id. Faun. Brit. Ind. Rhynch.* i, p. 241, fig. 154 (1902).

Biserat, Jalor. 20th October, 1901.

'On shrub with Nos. 23 and 28, *antea.*'

Also received from Ceylon, Burmah, and Borneo.

TESSARATOMINAE

Tessaratomaria

38. Tessaratoma javanica

Cimex javanicus, *Thunb. Nov. Ins. Sp.* ii, p. 45 (1783).

Tessaratoma javanica, *Amy. and Serv. Hém.*, p. 165 (1843); *Voll. Faun. Ind. Néerl.* iii, p. 25, pl. 3, f. 4b (1868); *Stål. En. Hem.* i, p. 67 (1870); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 259 (1902).

Tessaratoma proxima, *Westw. in Hope*, *Cat.* i, p. 27 (1837).

Tessaratoma papillosa, *Blanch. Hist. Ins. Hém.* p. 142, pl. vi, f. 2 (1840).

Tessaratoma angularis, *Dohrn*, *Stett. Ent. Zeit.* xxiv, p. 349 (1863).

Tesseratoma striata, furcifera, timorensis, and clara, *Walk. Cat. Het.* iii, pp. 463, 464 (1868).

Tessaratoma papillosum, *var.* clara, *Kirby*, *Journ. Linn. Soc. London*, *Zool.* xxiv, p. 87 (1891).

Tessaratoma papillosa, *part. Dist. Ann. Mag. Nat. Hist.* (7) vi, p. 60 (1900); *Stoll*, *Pun.*, fig. 2.

Biserat, Jalor. July, 1901.

'From long grass in jungle.'

Distributed throughout British India and the Malay Peninsula, and also found in many islands of the Malay Archipelago.

39. Pygoplatys minax

Pygoplatys minax, *Voll. Faun. Ind. Néerl.* iii, p. 23, pl. iii, f. 3 (1868).

Bukit Besar, Nawngchik. 3,500 feet. 27th August, 1901.

'Flying about in considerable numbers in stunted jungle at the top of the hill.'

Recorded also from Johore and Borneo.

40. Pygoplatys firmatus

Piezosternum firmatum, *Walk. Cat. Het.* iii, p. 458 (1868).

Pygoplatys firmatus, *Dist. Ann. Mag. Nat. Hist.* (6) xi, p. 432 (1893).

Bukit Besar, Nawngchik. 2,500 feet. 10th May, 1901.

Eusthenaria

41. Eusthenes eurytus

Eustenes eurytus, *Dist. Trans. Ent. Soc.*, 1887, p. 358; *id. Faun. Brit. Ind. Rhynch.* i, p. 265 (1902).

Bukit Besar, Nawngchik. 3,500 feet. 27th August, 1901.

'Flying about in considerable numbers in stunted jungle at the top of the hill.'

Also found in Assam.

42. Eusthenes saevus

Eusthenes sævus, *Stål. Trans. Ent. Soc.* (3) i, p. 597 (1863); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 265 (1902).

Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

Also found in India and China.

52. Mictis tenebrosa

Cimex tenebrosus, *Fabr. Mant.* ii, p. 288 (1787).
Mictis tenebrosus, *Dist. P.Z.S.*, 1901 (i) p. 327 ; *id Faun. Brit. Ind. Rhynch.* i, p. 344, fig. 209 (1902).
Cerbus umbilicatus, *Herr.-Schäff. Wanz. Ins.* vi, p. 29, pl. 190, fig. A (1842).
Myctis fasciatus, *Westw. in Hope Cat.* ii, p. 11 (1842).
Mictis nigricornis, *Dall. List. Hem.* ii, p. 400 (1852).
Stoll. Pun. fig. 277.

Biserat, Jalor.	3rd July, 1901.
Gedong, South Perak.	January, 1902.

'Amongst Indian corn, and elsewhere in open country.'
Distributed through British India, the Malay Peninsula, and China.

53. Mictis acutangula

Mictis acutangula, *Stål. Ann. Soc. Ent. Fr.*, 1865, p. 173.

Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

Found in Borneo and Malacca.

54. Anoplocnemis phasiana

Lygaeus phasianus, *Fabr. Spec. Ins.* ii, p. 361 (1781).
Anoplocnemis phasiana, *Dist. id. Ann. Mag. Nat. Hist.* (7) vi, p. 373 (1900) ; *id. P.Z.S.*, 1901 (i), p. 327 ; *Faun. Brit. Ind. Rhynch.* i, p. 346, fig. 210 (1902).
Lygaeus grossipes, *Fabr. Syst. Rhyng.*, p. 205, 11 (1803).
Cerbus tumidipes, *Herr.-Schäff. Wanz. Ins.* vi, p. 54, fig. 614 (1842).
Mictis punctum, affinis, bicolor, *Westw. in Hope Cat.* ii, p. 10 (1842).
Mictis dubia castanea, lata, *Dall. List. Hem.* ii, pp. 389, 390 (1852).
Myctis ferrifera, *Walk. Cat. Het.* iv, p. 24, 57 (1871).
Stoll. Pun., figs. 68, 69.

Biserat, Jalor.	October.
Bidor, South Perak.	February, 1902.
Gedong, South Perak.	January, 1902

Distributed throughout British India and the Malay Peninsula ; also found in many islands of the Malayan Archipelago.

Daladeraria

55. Dalader acuticosta

Dalader acuticosta, *Amy. and Serv. Hem.*, p. 188, pl. iv, fig. 7 (1843) ; *Dist. Faun. Brit. Ind. Rhynch.* i, p. 352, fig. 212 (1902).
Stoll. Pun., fig. 183.

Biserat, Jalor.

Distributed throughout British India.

56. Dalader planiventris

Acanonicus planiventris, *Westw. in Hope Cat.* ii, p. 8 (1842).
Dalader planiventris, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 352 (1902).
Dalader rotundicosta, *Amy. and Serv. Hém.* p. 188 (1843).

Biserat, Jalor. 11th July, 1901.

'Among low vegetation on waste ground.'

Found throughout British India and also in the Malay Peninsula and Sumatra.

Homoeoceraria

57. Homoeocerus limbatipennis

Tliponius limbatipennis, *Stål. Öfv. Vet.-Ak. Förh.*, 1859, p. 464.
Homoeocerus limbatipennis, *Stål. En. Hem.* iii, p. 60 (1873) ; *Dist. Faun. Brit. Ind. Rhynch.* i, p. 362 (1902).

Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

Found in Burma and Tenasserim and in several islands of the Malayan Archipelago.

58. Homoeocerus graminis

Lygaeus graminis, *Fabr. Syst. Rhyng.* p. 216, 55 (1803).
Homoeocerus graminis, *Stål. Hem. Fabr.* i, p. 59 (1868) ; *Dist. Faun. Brit. Ind. Rhynch.* i, p. 363 (1902).
Homoeocerus turbidus, *Walk. Cat. Het.* iv, p. 95 (1871).

Biserat, Jalor. 29th June, 1901. (At light).

Not uncommon in British India.

59. Homoeocerus abdominalis

Homoeocerus abdominalis, *Dist. Ann. Mag. Nat. Hist.* (7) vii, p. 11 (1901).

Biserat, Jalor. 20th October, 1901.

'One specimen on wing in open, late afternoon ; others on flowering shrub.'

Originally described from the Malay Peninsula.

67. Acanthocoris scaber

Cimex scaber, *Linn. Cent. Ins. rar.*, p. 17 (1763).
Alydus scaber, *Thunb. Hem. rostr. Cap.* iii, p. 2 (1822).
Acanthocoris acutus, *Dall. List. Hem.* ii, p. 516 (1852).
Acanthocoris scaber, *Stål. Berl. Ent. Zeit.* x, p. 158 (1866).

Bukit Besar, Nawngchik.	2,500 feet.	3rd May, 1901.
Sungkei, South Perak.		February, 1902.
Gedong, South Perak.		January, 1902.

'On Bukit Besar this species was very numerous, chiefly frequenting the stems and leaves of a prickly solenaceous plant, and was found in all stages of development under the same leaf.'

Also received from China and several islands of the Malayan Archipelago.

Pendulinaria

68. Pendulinus laminatus

Pendulinus laminatus, *Stål. En. Hem.* iii, p. 74 (1873).

Kampong Jalor, Jalor. ' October, 1901.

Described from Java; common at Penang.

Gonoceraria

69. Cletus punctulatus

Coreus punctulatus, *Westw. in Hope Cat.* ii, p. 23 (1842).
Cletus femoralis, *Kirby, Journ. Linn. Soc. Zool.* xxiv, p. 94 (1891).
Cletus punctulatus, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 392, fig. 231 (1902).

Bidor, South Perak. February, 1902.

70. Cletomorpha walkeri

Cletomorpha walkeri, *Kirby, Journ. Linn. Soc. Zool.* xxiv, p. 96 (1891); *Dist. Faun. Brit. Ind. Rhynch.* i, p. 397 (1902).
Cletomorpha benita, *Kirby, Journ. Linn. Soc. Zool.* xxiv, p. 97 (1891).

Bukit Besar, Nawngchik. 2,500 feet. 8th May, 1891.

Described from Ceylon.

Leptocorisaria

71. Leptocorisa costalis

Myodochus costalis, *Herr.-Schäff. Wanz. Ins.* viii, p. 96, fig. 864 (1848).
Leptocorisa biguttata, *Walk. Cat. Het.* iv, p. 174 (1871); *Bredd. Abh. Nat. Ges. Halle.* xxiv, p. 73 (1901).

Leptocorisa varicornis, *var.* biguttata, *Bredd. Abh. Senckenb. Ges.* xxv, p. 158.
Leptocorisa costalis, *Dist. Faun. Brit. Ind. Rhynch.* i, p. 411 (1902).

Biserat, Jalor. 30th June, 1901.

'On leaves of tall yellow-flowered pea.'

Telôm, Perak-Pahang boundary.	4,000 feet.	18th January, 1902.
Gedong, South Perak.		January, 1902.
Semangko Pass, Selangor-Pahang border.	2,700 feet.	23rd May, 1902.

'Very common, flying among long grass in old Sakai clearings.'

Found in Burma and Tenasserim, and also recorded from Java, Borneo, Celebes, and Gilolo.

72. Ourupira bicolor

Curupira bicolor, *Dist. Ann. Mag. Nat. Hist.* (7) vii, p. 426 (1901); *id. Faun. Brit. Ind. Rhynch.* i, p. 412, fig. 242 (1902).

Bukit Besar, Nawngchik. 2,500 feet. 25th August, 1901.

'Running on banana leaf in early morning, in company with a number of larvae, which resembled ants (*Oecophylla*) both in shape and movements.' N.A.

Not uncommon in Burma, and found in several islands of the Malayan Archipelago.

73. Acestra malayana, sp. nov.

(Pl. XV)

Ochraceous, with an olivaceous tint; eyes black, between eyes including the ocelli, a posteriorly curved fascia of black punctures; two small linear black lines on disk of anterior pronotal area; head and pronotum thickly punctate; coreum linearly punctate, membrane pale fuliginous hyaline; femora finely speckled with olivaceous; tibiae, tarsi, rostrum, and antennae, excluding basal joint, olivaceous. Length, 18½ mm.

Differs from *A. sinica*, Dall., by the more slender and non-pilose antennae, black marking to head and pronotum, etc.

Mabek, Jalor. 23rd July, 1901.

Alydaria

Porta, gen. nov.

Body elongate, slender; head triangularly produced in front; antennae about as long as the body, basal joint longer than the head, its apex a little clavate, second and fourth joints subequal, third joint a little shorter; rostrum passing the anterior coxae, first joint stout about reaching eyes, slightly shorter than second joint; legs long and slender, tibiae slightly longer than femora and longly hirsute; pronotum scarcely longer than head, with a distinct anterior collar and transversely constricted before middle, the anterior area subglobose, posterior angles armed with a long erect spine, slightly curved at apex; head with a central sulcation, the eyes placed at some distance from the anterior margin of the pronotum; abdomen slender, widened and thickened posteriorly, its lateral margins sinuate.

74. **Porta gracilis** sp. nov.

(Pl. XV)

Black, shining; head and abdomen beneath opaque; antennae, rostrum, and legs, dull castaneous; tibiae, tarsi, and basal joint of antennae—excluding apex, ochraceous; bases of femora, and spots to corium—of which the largest is near apical angle, pale stramineous; apex of first joint of antennae and extreme apices of tibiae, fuscous; pronotum and corium strongly punctate, tibiae longly hirsute. Length, 7½ to 8 mm.

Bukit Besar, Nawngchik. 2,500 feet. 9th and 17th May, 1901.

'In damp situations in jungle; very common on low vegetation.'

CORIZINAE

Corizaria

75. **Corizus robinsoni**, sp. nov.

(Plate XV)

Head ochraceous, or ochraceous with the base black, or wholly black; pronotum ochraceous, the anterior area narrowly, and the posterior area broadly black; scutellum black, a small linear spot at each basal angle, and the apex broadly ochraceous; corium pale greenish hyaline, its apical area broadly black, connexivium black, with large ochraceous spots; body beneath variable in coloration, sometimes ochraceous, the sternum darkly punctate, the abdomen with two central fuscous fasciae united posteriorly, or the abdomen piceous with the fasciae ochraceous; stigmatal and marginal spots ochraceous; antennae piceous, apical joint fuscous, first joint short, incrassated, second, third, and fourth joints subequal in length; legs luteous, speckled with black, sometimes almost totally black; membrane pale hyaline, Length, 6 mm.

Biserat, Jalor. 29th June, 1901.

'Flying about among low bushes on waste ground; flight very rapid, easy, and fly-like.'

Serinetharia

76. Serinetha abdominalis

Lygaeus abdominalis, *Fabr. Syst. Rbyng.*, p. 226 (1803).
Leptocoris abdominalis, *Burm. Handb.* ii, p. 305 (1835).
Lygaeomorphus abdominalis, *Blancb. Hist. des Ins.* iii, p. 116 (1840).
Pyrrhotes abdominalis, *Westw. in Hope Cat.* ii, p. 26 (1842).
Serinetha abdominalis, *Stål. Hem. Fabr.* i, p. 68 (1868); *Dist. Faun. Brit. Ind. Rbynch.* i, p. 419, fig. 246 (1902).
Lygaeus augur (part), *Fabr. Ent. Syst.* iv, p. 161 (1794).
Leptocoris rufus, *Habn. Wanz. Ins.* i, p. 201, fig. 102 (1831).
Serinetha taprobanensis, *Dall. List. Hem.* ii, p. 461 (1852).
Leptocoris bahram, *Kirk*, *Bull. Liverp. Muss.* ii, p. 46 (1899).

'Our collections afford numerous instances of the convergent groups noted in Sarawak by Mr. SHELFORD.[1] The present species belongs to that author's group I (Lycoid pattern). Our own examples include, besides the longicorn *Eurycephalus lundi*, several Malacoderms and a Hispid, not yet identified, and Hemiptera of three families, viz., *Serinetha abdominalis* (Coreidae), *Antilochus coqueberti* and *Dindymus rubiginosus* (Pyrrhocoridae), *Vilius macrops* (Reduviidae). The large Malacoderms of this group were extremely common at Telôm, where both *S. abdominalis* and *Ectatops rubiaceous* were taken.'

Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

LYGAEIDAE

LYGAEINAE

77. Tropidcthorax fimbriatus

Lygaeus fimbriatus, *Dall. List. Hem.* ii, p. 546 (1852).
Melanospilus fimbriatus, *Stål. En. Hem.* iv, p. 104 (1874).

Patani.

Recorded from Ceylon, Java, and the Philippine Islands.

78. Graptostethus diffusus

Lygaeus diffusus, *Walk. Cat. Het.* v, p. 59 (1872).
Graptostethus diffusus, *Dist. Ann. Mag. Nat. Hist.* (7) vii, p. 537 (1901).

Biserat, Jalor. 30th June, 1901.

'Feeding on the seed-vessels of a tall, yellow flowered leguminous plant growing on open waste ground.'

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[1] *P.Z.S.*, 1902, pp. 267-272.

BLISSINAE

79. Spalacocoris sulcatus

Ischnodemus sulcatus, *Walk. Cat. Het.* v, p. 133 (1872).
Spalacocoris sulcifer, *Stål. En. Hem.* iv, p. 130 (1874).
Spalacocoris sulcatus, *Dist. Ann. Mag. Nat. Hist.* (7) viii, p. 466 (1901).

Bukit Besar, Nawngchik. 2,500 feet. 6th May, 1901.

'Found sucking the young shoot of zingiberaceous plant; emitted a very powerful and disagreeable odour.'

A well-known Malaccan species.

GEOCORINAE

80. Geocoris splendidus

Geocoris splendidus, *Dist. Faun. Brit. Ind. Rhynch.* ii, p. 30 (1903)

Biserat, Jalor

Originally described from Burma.

COLOBATHRISTINAE

81. Artemidorus noctis, sp. nov.

(Pl. XV)

Black, shining, coarsely punctate; hemelytra piceous brown; extreme apex of scutellum, two large spots to connexivium—one near base the other near apex; acetabula, trochanters, bases of posterior femora, under surface of anterior femora; apex of second joint of rostrum and antenniferous tubercles luteous; body and antennae pilose; lateral margins of pronotum and the legs longly pilose; anterior and intermediate femora with a short spine beneath, near apices; posterior lobe of pronotum and the scutellum with a distinct central carination; first and fourth joints of antennae shortest and subequal; second longest, longer than third. Length, 9 mm.

Bukit Besar, Nawngchik. 2,500 feet.

82. Malcus flavidipes

Malcus flavidipes, *Stål. Freg. Eug. Resa. Ins.*, p. 242, pl. iii, fig. 2 (1856).

Bukit Besar, Nawngchik. 2,500 feet. 28th August, 1901.

'On plant growing in stream.'

Found also in British India and Java.

PACHYGRONTINAE

83. Pachygrontha brevicornis.

Pachygrontha brevicornis, *Stål. Öfv. Vet.-Ak. Förh.*, 1870, p. 662.

Gedong, South Perak. January, 1902.

Also found in the Phillipines.

APHANINAE

84. Clerada apicicornis

Clerada apicicornis, *Sign. in Maillard, Notes sur l'ile Réun. Ins.*, p. 28 ; *Stål. Hem. Afr.* ii, p. 155 (1865) ; *Dist. Ann. Mag. Nat. Hist.* (7) viii, p. 476 (1901).

Gastrodes terminalis, *Walk. Cat. Het.* v, p. 122 (1872).

Very widely distributed. Already recorded from the Neotropical, Ethiopian, Oriental, and Australasian regions.

85. Pamera pallicornis

Rhyparochromus pallicornis, *Dall. List. Hem.* ii, p. 573 (1852).
Plociomerus discoguttata, *Dohrn. Stett. Ent. Zeit.* xxi, p. 404 (1860).
Rhyparochromus delineatus, *Walk. Cat. Het.* v, p. 103 (1872).
Pamera pallicornis, *Dist. Ann. Mag. Nat. Hist.* (7) viii, p. 479 (1901).

Bukit Besar, Nawngchik.	1,500 feet.	19th May, 1901.	
Biserat Jalor.		1st July, August, 1901.	(At light).
Bidor, South Perak.		February, 1902.	(At light).
Kuala Lumpur, Selangor.		April, 1902.	(At light).

'On Bukit Besar, among long grass.'

Found in Ceylon, many islands of the Malayan Archipelago, and in Japan.

86. Pamera nietneri

Plociomerus nietneri, *Dohrn. Stett. Ent. Zeit.* xxi, p. 404 (1860).
Pamera nietneri, *Stål En. Hem.* iv, p. 151 (1874).

Patani Town.

Found also in Ceylon, Java, Philippines, and Cochin China.

87. Eucosmetus incisus

Rhyparochromus incisus, *Walk. Cat. Het.* v, p. 100 (1872).

97. Dindymus rubiginosus

Cimex rubiginosus, *Fabr. Mant. Ins.* ii, p. 301 (1787) ; *Gmel. Syst. Nat.* i, iv, p. 2174 (1788).

Lygaeus rubiginosus, *Fabr. Ent. Syst.* iv, p. 159 (1794) ; *id. Syst. Rhyng.*, p. 226 (1803).

Pyrrhocoris rubiginosus, *Burm. Handb.* ii, i, p. 284 (1835).

Dindymus rubiginosus, *Stål. Berl. Ent. Zeit.* vii, p. 399 (1863).

Dysdercus hypogastricus, *Herr. Schäff. Wanz. Ins.* ix. p. 177, fig. 979 (1853).

Bukit Besar, Nawngchik. 2,500 feet.
Biserat, Jalor. 20th October, 1901.

'In conspicuous positions on bushes.'

Common in both Java and Sumatra.

98. Dindymus albicornis

Lygaeus albicornis, *Fabr. Syst. Rhyng.*, p. 223 (1803).

Dindymus albicornis, *Stål. Berl. Ent. Zeit.* vii, p. 399 (1863) ; *id. Hem. Fabr.* i, p. 82 (1868).

Bukit Besar, Nawngchik. 2,500 feet. May, 1901.

'This species is not uncommon in August and September on the trunks of trees in the jungle on Bukit Besar. The very young larvae have something of a resemblance to small specimens of the ant *Oecophylla smaragdina*, while the adults might be mistaken at a casual glance for newly-hatched larvae[1] of the mantis *Hymenopus bicornis*, though they are not generally found in the same situations.' N.A.

Dolacamplus, nov.

Allied to *Dindymus*, Stal. ; head immersed to eyes, which touch the anterior margin of the pronotum ; rostrum reaching the posterior coxae, first joint shorter than head, which is prominently and broadly centrally grooved or sulcated beneath ; antennae with the first and fourth joints longest and subequal, or first not longer than fourth ; pronotum with the lateral margins strongly sinuate and laminate, very slightly reflexed, transversely impressed near middle ; scutellum rather small, triangular ; corium a little broadened posteriorly ; basal incisures to the second, third and fourth abdominal segments, upwardly recurved ; anterior femora moderately incrassated, anterior tibiae with a short apical spine.

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[1] But Shelford believes that these larvae mimic the larvae of *Eulyesamoena*. I shall have more to say on this point later.—N. A.

99. Delacampius typicus, sp. nov.

(Pl. XV)

Dark piceous ; lateral margins of pronotum and corium broadly reddish ochraceous ; membrane with a narrow transverse curved ochraceous line near base ; lateral margins of prosternum and abdomen reddish ochraceous ; rostrum and tarsi brownish ochraceous ; antennae black ; apical joint pale luteous ; its apex black ; posterior lobe of pronotum and scutellum coarsely punctate ; corium with some coarse punctures on basal area ; antennae with the first, second, and third joints pilose.

Length, 8 mm.

Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

100. Dysdercus simplex

Dindymus simplex, *Walk. Cat. Het.* vi, p. 6 (1873).
Dysdercus decorus, *Bredd. Zeit. für Entomologie*, 1901, p. 115.
Dysdercus simplex, *Dist. Ann. Mag. Nat. Hist.* (7) ix, p. 42 (1902).

Tanjong Patani, Jhering. 29th September, October, 1901.

'Common on trunks of casuarina trees by the sea.'

Also recorded from Sikkim, Nicobars, and several islands of the Malayan Archipelago.

101. Dysdercus cingulatus

Cimex cingulatus, *Fabr. Syst. Ent.*, p. 719 (1775) ; *Goeze. Ent. Beytr.* ii, p. 256 (1778).
For full synonymy cf. Leth. and Sev. (*excl.* poecilus H.S.) *Cat. Gen. Hem.* ii, p. 252 (1894).

Biserat, Jalor. June, July, October, 1901.

' At light, and on flowers.'

Jhering, Jambu.		June, 1901.
Bukit Besar, Nawngchik.	500 feet.	May, 1901.
Bidor, South Perak.		February, 1902.
Sungkei, South Perak.		February, 1902.

'This species is one of the commonest and most conspicuous of the Heteroptera in the Patani States, though scarcer and more local in Perak. It is mimicked very closely indeed by the longicorn *Rhaphuma placida*, Pasc., of which a single specimen was brought us by a native, together with one of the bug. The beetle is widely distributed throughout the Malay Archipelago, ranging at least as far as Celebes, but does not appear to have been hitherto recorded from the Peninsula, where it must be rare, as only a single specimen was met with.'

Widely distributed throughout British India and the Malayan Archipelago, and recorded from China.

102. Dysdercus poecilus

Pyrrhocoris poecilus, *Herr.-Schäff. Wanz. Ins.* vii, p. 17, fig. 699 (1844).
Dysdercus poecilus, *Bredd. Wien. Entomol. Zeit.* xx, p. 85 (1901); *Dist. Ann. Mag. Nat. Hist.* (7) ix, p. 42 (1903).
Dysdercus concinnulus, *Walk. Cat. Het.* vi, p. 11 (1873).

Biserat, Jalor.	29th June, 1901.
Bidor, South Perak.	February, 1902.

A variable species widely distributed in the Malayan Archipelago.

'In both cases found with the preceding species.' N.A.

TINGIDIDAE

Penottus, gen. nov.

Head exposed, no pronotal hood; head without spines, but with three small rounded tubercles on disk behind the insertion of the antennae, which have the first joint strongly incrassate, longer than the second, which is also less incrassate; third joint much the longest and slender; fourth, nearly half the length of the third, cylindrical, pilose; head beneath and sternum sulcate; pronotum, with the exception of the posterior prolongation, consisting of two very large globular processes separated narrowly, centrally, and longitudinally; these processes are covered with pentagonal cells, most of which have a distinct central indentation; posterior pronotal prolongation flat, finely areolate, centrally carinate, its margins also carinate; elytra widening from near base; apical margins rounded, finely areolate; the areolets larger on lateral and apical areas; sutural area very large; discoidal, subcostal, and costal areas distinct; elytra much longer than abdomen.

103. Penottus jalorensis, sp. nov.

(Pl. XV)

Head, pronotal processes, sternum, and abdomen beneath, piceous; posterior pronotal prolongation and the elytra creamy white, thickly covered with small fuscously coloured areolets; lateral elytral margins with a distinct fuscous spot near middle and near apex; abdomen above pale purplish red; antennae luteous, with the apical joint black; coxae trochanters and legs ochraceous, apices of tibiae and the tarsi fuscous.

Length, 3½ mm.

Mabek, Jalor. 24th July, 1901.

'Among low shrubs at the edge of rice fields.'

PHYMATIDAE

104. Carcinochelis determinatus, sp. nov.

(Pl. XV)

Pale ochraceous; eyes, apical joint of antennae, posterior lobe of pronotum and scutellum, pale fuscous; margins and a central line to scutellum luteous; abdomen above luteous, disc of apical area testaceous, a large central and small subapical, marginal fuscous spot; corium creamy white, finely speckled with fuscous, the apical angle piceous, membrane pale fuliginous, body beneath and legs pale ochraceous; anterior tarsal claws, intermediate and posterior tibia and tarsi fuscous; first and second joints of antennae short, incrassate, third slender-apically clavate, apical joint thick fusiform; head above granulate, its lateral margins obtusely crenulate; anterior pronotal area finely spinous and with about six more prominent and suberect spines; abdomen rounded centrally and attenuated posteriorly, the connexivial margin finely serrate but not angulate.

Length, 6½ mm.

Mabek, Jalor. July 25th, 1901.

'On upper surface of leaves of low shrubs in jungle.'

This is the second time this genus has been accurately localized; the type *C. alutaceus* being without a habitat.

105. Glossopelta sp.

One immature form from Biserat.

ARADIDAE

106. Brachyrhynchus membranaceus

Aradus membranaceus, *Fabr. Syst. Rhyng.*, p. 118 (1803).
Brachyrhynchus membranaceus, *Stål. Hem. Fabr.* i, p. 96 (1868).
Aradus albipennis, *Fabr. Syst. Rhyng.*, p. 118 (1803).
Brachyrhynchus albipennis, *Stål. Hem. Fabr.* i, p. 96 (1868).
Brachyrhynchus orientalis, *Lap. Ess. Hem.* p. 54 (1832); *Amy. and Serv. Hem.* p. 305 (1843).
Dysodius membranaceus. *Herr.-Schäff. Wanz. Ins.* p. 122, fig. 887 (1848).
Crimia niger, *Dobrn. Stett. Ent. Zeit.* xxi, p. 406 (1860).
Aradus lugubris, *Boisd. Voy. Astrol. Ins.* ii, p. 642, pl. ii, fig. 24 (1835).
Brachyrhynchus nasutus, *Stål. Öfv. Vet. Ak.-Förh.*, 1870, p. 673.

Kuala Lumpur, Selangor. April, May, 1902. (At light).

Widely distributed throughout British India and the Malayan Archipelago.

107. Neuroctenus serrulatus

Neuroctenus serrulatus, *Stål. Öfv. Vet.-Ak. Förh.*, 1870, p. 674; *Bergr. Öfv. Finska Vet. Soc. Förh.* xxix, p. 179 (1887).

Jeram Kawan, South Perak. February, 1902.

'In large numbers under bark of dead tree, with larvae.'

Also recorded from Java, Ceylon, and the Philippines.

HYDROMETRIDAE

VELINAE

108. Rhagovelia insignis, sp. nov.

(Pl. XV)

Purplish black; pronotum with two transverse ochraceous spots near anterior margin; hemelytra with four silvery white spots—one largest and elongate at base, two on posterior disk, and one at apex; besides these there is an obscure whitish claval streak and an obscure minute spot above and between the two discal spots; antennae piceous pilose; legs and rostrum brownish ochraceous; apex of rostrum piceous; antennae with the first and second joints stoutest, shortest, and subequal; third and fourth longest and subequal; tarsi with the first joint a little longer than the second.

Length, 3½ mm.

Bukit Besar, Nawngchik. 2,500 feet. 24th August, 1901.

'Running in great numbers on the surface of small pools of rain-water collected between the buttresses of jungle tree.'[1]

109. Perittopus rufus

Perritopus rufus, *Fieb.* (*ined.*) *Dist. Faun. Brit. Ind. Rhynch.* ii, p. 175, fig. 128 (1903).

Sempan, Selangor-Pahang boundary. 4,000 feet. May, 1902.

Also found in Tenasserim.

GERRINAE

110. Gerris fossarum

Cimex fossarum, *Fabr. Syst. Ent.*, p. 727 (1775); *id. Spec. Ins.* ii, p. 375 (1781); *Id. Mant. Ins.* ii, p. 308 (1787).

Gerris fossarum, *Fabr. Ent. Syst.* iv, p. 188 (1794); *Wolff. Ic. Cim.* p. 118, pl. xii, fig. 112 (1802).

Hydrometra fossarum, *Fabr. Syst. Rhyng.*, p. 258 (1803).

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[1] Cf. *antea*, Part I, p. 149, under *Gonatodestaffinis.*

Limnogonus fossarum, *Stål. Hem. Fabr.* i, p. 133 (1868).
Gerris discolor, *Stål. Freg. Eug. Resa. Ins.*, p. 265 (1859).

Tanjong Patani, Jhering. 30th September, 1901.

'Running and leaping on the surface of a small pool.'

Sungkei, South Perak. February, 1902. (At light).

111. Ptilomera laticaudata

Gerris laticaudata, *Hardw. Trans. Linn. Soc.* xiv, p. 134, pl. vi, figs. 1-4 (1825).
Ptilomera laticaudata, *Amy. and Serv. Hem.*, p. 414, pl. viii, fig. 3 (1843) ;
Herr.-Schäff. Wanz. Ins. ix, p. 65, fig. 940 (1853).
Ptilomera cingalensis, *Stål. Öfv. Vet.-Ak. Förh.* xii, p. 190 (1856).
Ptilomera tigrina, *Uhler. Proc. Acad. Philad.*, 1860, p. 230.

Bukit Besar, Nawngchik. 2,500 feet. 25-26th August, 1901.

'Running on surface of clear jungle stream in shade.'

112. Metrocoris nigrofasciatus sp. nov.

(Pl. XV)

Ochraceous ; a discal spot on head ; eyes, anterior and posterior margins, and a central longitudinal fascia to pronotum, the last extending through the mesonotum, which also has two slightly curved fasciae on each lateral area of its anterior half, and two sinuate transverse fasciae crossing its posterior half, which are united a little before lateral margins, margins of abdominal segments above, a longitudinal lateral basal marginal line to abdomen beneath, a small linear spot at base and apex of intermediate coxae beneath, a longitudinal fascia to posterior coxae above, two longitudinal fasciae to anterior femora above, anterior tibiae and tarsi, antenniferous tubercles, antennae, excluding base, a spot at base and the apex to rostrum, black ; intermediate and posterior legs somewhat brownish ochraceous. Ovate, widest behind the middle ; head broadly convex ; anterior femora stout, moderately curved, with a stout tuberculous tooth near apex ; anterior tibiae stout, about as long as femora ; intermediate femora longer and a little stouter than the posterior femora.

Length, ♂ 6 mm.

Bukit Besar, Nawngchik. 2,500 feet. 26th August, 1901.

'Running on the surface of clear jungle stream in shade.'

113. Halobates sexualis, sp. nov.

(Pl. XV)

♂. Silvery-grey; eyes, antennae, and rostrum black; two basal spots almost meeting in centre and reaching eyes; lateral and apical margins of abdomen, base of antennae, head beneath, disk of prosternum, anterior coxae and trochanters, large spot near intermediate coxae, intermediate and posterior coxae beneath, and anal appendage beneath, luteous; legs blackish-grey.

♀. Silvery-grey above; posterior margins of pronotum, mesonotum, and metanotum and a central line extending through pronotum to basal half of abdomen, chocolate-brown; body beneath ochraceous, an oblique piceous fascia before the intermediate coxae.

Antennae with the first joint about as long as the three remaining joints together, which are almost subequal in length; intermediate legs longer and a little stouter than posterior legs; intermediate tibiae about as long as posterior femora.

Length, ♂ 4½; ♀ 3½ mm.

Estuary of the Jambu River, Jhering. 10th June, 1901.

REDUVIIDAE

EMESINAE

Ploiariaria

114. Ploiariola contaminata, sp. nov.

(Pl. XVI)

Very pale luteous; abdomen, excluding basal third, above and beneath dark fuscous; eyes black; anterior coxae with two broad annulations, anterior femora and tibiae with three broad annulations, brownish-ochraceous; hemelytra creamy-white, much mottled, with pale fuscous; a small subapical spot to first joint of antennae, three or four similar spots to intermediate and posterior femora, and a subbasal spot to intermediate and posterior tibiae, piceous; first joint of antennae about as long as abdomen; head, anterior pronotal lobe, and anterior legs longly pilose; posterior femora slightly passing abdominal apex.

Length, 6 mm.

Biserat, Jalor.

Leistarcharia

115. Luteva malayana, sp. nov.

(Pl. XVI)

Pale luteous; lateral margins of pro- and mesonota and the intermediate and posterior less fuscous; hemelytra creamy-white with a rather large pale slatey-coloured spot in the membranal cellular spaces; eyes black;

first joint of antennae longer than abdomen, scarcely longer than second joint; hemelytra about reaching abdominal apex; posterior femora as long as body including head, considerably passing abdominal apex.

Length, 7 mm.

Biserat, Jalor. 18th October, 1901.

'At light. Rested on support of lamp shade, and swayed its body up and down after the manner of a tipulid.'

STENOPODINAE

116. Pygolampis macera

Pygolampis macera, *Walk. Cat. Het.* viii, p. 37 (1873).

Biserat, Jalor. 9th July, 1901.

'From low vegetation on waste ground.'

Originally described from Malacca.

117. Canthesancus gulo

Canthesancus gulo, *Stål. Ann. Soc. Ent. Fr.*, 1863, p. 44.

Sungkei, South Perak. February, 1902.

Originally described from Malacca; found in Assam.

SALYAVATINAE

118. Petalochirus fasciatus, sp. nov.

(Pl. XVI)

Piceous: two slightly curved longitudinal fasciae to posterior lobe of pronotum, corium, and large spots to connexivium, above and beneath, pale ochraceous; clavus and claval area of corium mottled with fuscous; apical margin of corium irregularly black; membrane fuscous mottled with ochraceous; sternum piceous; abdomen beneath ochraceous, with a dark piceous central fascia and a broader and paler piceous sublateral fascia, marginal abdominal spines black; legs dark obscure castaneous, inner margins of anterior tibiae and the intermediate and posterior tibiae ochraceous, the last with basal, apical, and medial piceous annulations; antennae with the first and second joints piceous, remainder mutilated; first joint obscurely annulated with castaneous; spines at antenniferous tubercles and lateral pronotal, angles long, obliquely directed upward, anterior pronotal angles prominently spinous, scutellar spine erect, long, slightly directed backward; abdominal marginal spines long, a little curved backward; abdomen above, pale sanguineous.

Length, 15-16 mm.

Biserat, Jalor. 3rd July, 1900.

119. Petalochirus spinosissimus, sp. nov.

(Pl. XVI)

Head, pronotum, scutellum, body beneath, and legs, brownish-castaneous; corium, marginal spots to connexivium, above and beneath, and intermediate and posterior tibiae ochraceous, the last with basal, apical, and medial piceous annulations; clavus and claval and apical areas of corium mottled with fuscous; a black and much sinuated spot on inner apical margin of corium; lateral pronotal spines very long and robust, directed upward and forward, a little curved toward apices; abdominal spines, long, robust, straight, moderately directed backward.

Length, 13½ mm.

Biserat Jalor.

ACANTHASPINAE

120. Alloeocranum maculosum, sp. nov.

(Pl. XVI)

Ochraceous, mottled with fuscous, the membrane more finely and thickly mottled; base and apex of clavus, basal, apical, and two spots at inner angle of corium, and broken basal margin to membrane, creamy-white; femora and tibiae biannulated with fuscous; antennae mutilated; connexivum ochraceous, with a series of small marginal fuscous spots, above and beneath.

Allied to *A. biannulipes*, but distinct by the altogether different corium and membrane, which is constant in all the specimens I have examined from different parts of the world in MONTROUZIER and SIGNORET's species; from *A quadrisinatus*, Reut., it differs by its annulated legs.

Length, 6½ mm.

Gedong, South Perak. January, 1902.

'Found on bark of tree in jungle.'

121. Gerbelius confluens, sp. nov.

(Pl. XVI)

Ochraceous: head, pronotum, scutellum, posterior half of corium, membrane, sternum, and broad sublateral margins to abdomen beneath, black; a broad subapical annulation to femora, and spots to connexivium above and beneath, castaneous; posterior lateral angles to pronotum, and apex of scutellum, ochraceous; antennae and basal joint of rostrum, brownish ochraceous; posterior angles of the first, second, third, and fourth abdominal segments prominently spinous; anterior femora with short robust spines beyond middle of under surface; first joint of antennae shorter than the anteocular portion of head; second joint about as long as head; pronotum, with the lateral margins, strongly sinuate; centrally, profoundly sulcate; lateral angles roundly subprominent.

Length, 7 mm.

Bukit Besar, Nawngchik. 2,500 feet.

122. Velitra rubropicta

Opinus rubropictus, *Amy. and Serv. Hem.*, p. 339 (1843).
Platymeris discolor, *Herr.-Schäff. Wanz. Ins.* viii, p. 31, fig. 805 (1848).
Reduvius rivulosus, *Walk. Cat. Het.* vii, p. 194 (1873).
Velitra rubropicta, *Stål. En. Hem.* iv, p. 69 (1874); *Dist. Ann. Mag. Nat. Hist.* (7) x, p. 189 (1902).

Biserat, Jalor. July, 1901.

'On labiate herbs and at light. When handled inflicts a painful sting, the effect of which lasts for about half an hour. At the same time the insect emits a powerful odour of the usual kind.'

Generally distributed from India to several islands of the Malayan Archipelago.

123. Sminthus singularis

Reduvius singularis, *Walk. Cat. Het.* vii, p. 198 (1873).
Sminthus singularis, *Dist. Ann. Mag. Nat. Hist.* (7) x, p. 189 (1902).
Tapeinus heydeni, *Bredd. Wien. Ent. Zeit.* xxi, p. 23 (1902).

Jeram Kawan, South Perak. 15th February, 1902.

'Under bark of dead tree.'

124. Sminthus fuscipennis

Sminthus fuscipennis, *Stål. En. Hem.* iv, p. 68 (1874).

Semangko Pass, Selangor-Pahang boundary. 2,700 feet. May, 1902. (Under bark).

Received also from Assam and Sikkim.

125. Staliastes rufus

Tapeinus rufus, *De Casteln. Ess. Hem.*, p. 82 (1832).
Tapinus rufus, *Burm. Handb.* ii, p. 236 (1835).
Opinus rufus, *Amy. and Serv. Hem.*, p. 340, pl. vii, fig. 3 (1843).

Opinus semicostalis, *Walk. Cat. Het.* viii, p. 4 (1873).
Staliastes rufus, *Dist. Ann. Mag. Nat. Hist.* (7) x, p. 190 (1902).

Bukit Besar, Nawngchik. 2,500 feet. 18th May, 1901.

'Under bark of dead tree in jungle.'

A common Javan insect.

PIRATINAE

126. Ectomocoris atrox

Pirates atrox, *Stål. Öfv. Vet.-Ak. Förh.*, 1855, p. 187.
Pirates diffinis, *Walk. Cat. Het.* vii, p. 120 (1873).
Pirates ypsilon, *Kirby, Journ. Linn. Soc. Zool.* xxiv, p. 113, pl. iv, fig. 8 (1891).
Pirates stigmativentris, *Kirby, loc. cit.*, p. 112 (*immature form*).
Ectomocoris atrox, *Dist. Ann. Mag. Nat. Hist.* (7) x, p. 282 (1902).

Also distributed through British India, Cochin China, and Java.

Sungkei, South Perak. February, 1902.

ECTRICHODINAE

127. Caecina spinulosa

Caecina spinulosa, *Stål. Ann. Soc. Ent. Fr.*, 1863, p. 48.[1]

Bukit Besar, Nawngchik. 2,500 feet. 30th August, 1901.

'On leaves of wild bananas.'

Found also in Cambodia and Borneo.

128. Ectrychotes coloratus

Larymna colorata, *Mayr. Verb. Zool. Bot. Ges. Wien.* xv, p. 439 (1865); *id. Reise Novara Hem.*, p. 157, fig. 43 (1866).
Ectrychotes coloratus, *Stål. En. Hem.* iv, p. 51 (1874).

Kampong Jalor, Jalor. 5th November, 1901.

'On blades of grass above the surface of flooded rice fields.'

Received also from Java and Borneo.

129. Ectrychotes, sp.

One specimen representing a species or variety near *E. atripennis*, *Stål.*

Bukit Besar, Nawngchik. 2,500 feet.

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[1] Breddin (*Zool. Anzeig.* xxvi, p. 508 (1903), has apparently recently redescribed Stal.'s genus *Caecina* under the name of *Camelocastra*. He has also described two species, one of which, *Camelocastra javana*, is probably the *C. spinulosa*, Stal., as enumerated above.

130. Vilius macrops

Ectrichodia macrops, *Walk. Cat. Het.* viii, p. 48 (1873).
Vilius macrops, *Dist. Ann. Mag. Nat. Hist.* (7) x, p. 292 (1902).

Biserat, Jalor. 3rd July, 1901. (At light).

Originally described from Siam.

APIOMERINAE

131. Amulius longiceps

Amulius longiceps, *Stål. Öfv. Vet.-Ak. Förh.*, 1866, p. 246.

Bukit Besar, Nawngchik. 300 feet. 10th May, 1901.

'Feeds on the sticky exudation of certain jungle trees, and is usually covered with this substance.'

HARPACTORINAE

132. Harpactor fuscipes

Reduvius fuscipes, *Fabr. Mant. Ins.* ii, p. 312, 33 (1787); *Stål. Hem. Fabr.* i, p. 110 (1868).
Reduvius sanguinolentus, *Wolff. Ic. Cim.* iv, p. 166, fig. 160 (1804).
Reduvius corallinus, *Lep. and Serv. Encycl. Meth.* x, p. 279 (1825).
Reduvius costalis, *Stål. Öfv. Vet. Ak.-Förh*, 1866, p. 285.
Harpactor bicoloratus, *Kirby, Journ. Linn. Soc. Zool.* xxiv, p. 119 (1891).
Harpactor fuscipes, *Dist. Ann. Mag. Nat. Hist.* (7) xi, p. 205 (1903).

Ban Sai Kau, Nawngchik. 19th-23rd May, 1901.

Widely distributed throughout the Oriental region.

133. Harpactor chersonseus

Harpactor chersonesus, *Dist. Ann. Mag. Nat. Hist.* (7) xi, p. 207 (1903).

Ban Sai Kau, Nawngchik.	19th-23rd May, 1901.
Biserat, Jalor.	17th October, 1901.

'The specimens from Biserat were found on a flowering shrub, and one individual was observed feeding on a small black bee (*Trigona*,[1] sp.), which it closely resembled when on the wing. If this is really an instance of what has been termed *aggressive* resemblance the case is extremely interesting, for the same bee is also said to be mimicked for purposes of *protection* by a small longicorn (*Epania singaporensis*), which was captured on the same shrub.'

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[1] *Melipona vidua*, Lepel (Cf. Shelford, *l.c.*)

Originally described from Penang and Burma. In some of the specimens collected by Messrs. ANNANDALE and ROBINSON the dull reddish apical marginal area of the corium is confined to the apical angle, and in other specimens is practically absent. It is quite possible that varietal forms may be discovered to link this species with *H. flavus*, DIST.

134. Harpactor vicinus

Reduvius vicinus, *Stål. Öfv. Vet. Ak.-Förh.*, 1859, p. 202.
Reduvius (Lamphrius) sericans, *Reut. Act. Soc. Sc. Fenn.* xii, p. 293 (1881).

Bukit Besar, Nawngchik. 2,500 feet. 10th May, 1901.

Also found in Borneo, Sumatra, and several other islands of the Malayan Archipelago.

135. Vesbius purpureus

Cimex purpureus, *Thunb. Nov. Ins. Sp.* iii, p. 57, fig. 67 (1784).
Reduvius purpureus, *Thunb. Hem. rostr. Cap.* iii, p. 4 (1822).
Harpactor milthinus, *Herr.-Schäff. Wanz. Ins.* viii, p. 82, fig. 850 (1848).
Vesbius purpureus, *Stål. En. Hem.* iv, p. 36 (1874).

Biserat, Jalor. August, 1901.

Somewhat widely distributed in the Oriental region, and known from China.

136. Vesbius sanguinosus

Vesbius sanguinosus, *Stål. En. Hem.* iv, p. 36 (1874).

Sungkei, South Perak. February, 1902.
Gedong, South Perak. January, 1902.

Described from Java, and known from Assam.

137. Cosmolestes picticeps

Reduvius picticeps, *Stål. Öfv. Vet.-Ak. Förh.*, 1859, p. 204.
Cosmolestes picticeps, *Stål. En. Hem.* iv, p. 32 (1874).

Patani. 21st June, 1901.
Biserat, Jalor. June, July, 1901.

Found extensively throughout the Oriental region.

138. Velinus malayus

Reduvius malayus, *Stål. Ann. Soc. Ent. Fr.*, 1863, p. 37.
Velinus malayus, *Stål. En. Hem.* iv, p. 31 (1874).

Bukit Besar, Nawngchik.	2,500 feet.	1st May, 1901.
Ban Sai Kau, Nawngchik.		19th-23rd May, 1901.
Biserat, Jalor.		June, July, 1901.

Originally described from Malacca.

139. Velinus nigrigonu

Euagoras nigrigenu, *Amy. and Serv. Hém.*, p. 369 (1843).
Reduvius nigrigenu, *Stål. Öfv. Vet.-Ak. Förh.*, 1859, p. 204.
Velinus satellitius, *Stal. Öfv. Vet.-Ak. Förh.*, 1866, p. 281.
Velinus nigrigenu, *Stal. En. Hém.* iv., p. 32 (1874).

Jalor.		July, 1901.
Jor, South Perak.	2,000 feet.	January, 1901.

Received from both Malacca and Java.

140. Arceslus bicolor, sp. nov.

(Pl. XVI)

Black, shining ; apical angle of corium, membrane, and abdomen above and beneath, golden-yellow ; head about as long as pronotum ; first joint of antennae about as long as head ; pronotum with the anterior angles tuberculous, the anterior lobe gibbous, tuberculate, centrally sulcate, posterior lobe rugose, lateral and posterior angles prominent, and with two distinct tubercles on posterior disc ; femora subnodulose near apices.

Length, 15 mm.

Bukit Besar, Nawngchik.

141. Sycanus collaris

Reduvius collaris, *Fabr. Spec. Ins.* ii, p. 380 (1781) ; *Mant. Ins.* ii, p. 312 (1787).
Zelus collaris, *Fabr. Syst. Rhyng.*, p. 285 (1803).
Arilus collaris, *Burm. Handb.* ii, p. 229 (1835) ; *Herr.-Schäff. Wanz. Ins.* viii, p. 37, fig. 813 (1848).
Sycanus collaris, *Dohrn. Stett. Ent. Zeit.* xx, p. 98 (1859) ; *Stål. En. Hém.* iv, p. 28 (1874) ; *Dist. Ann. Mag. Nat. Hist.* (7) ii, p. 212 (1903).
Cimex carbonarius, *Gm. Syst. Nat.* i, iv, p. 2199 (1788).
Reduvius longicollis, *Lep. and Serv. Encycl. Méth.* x, p. 278 (1825).
Sycanus leucomesus, *Walk. Cat. Hét.* viii, p. 84 (1873).

Biserat, Jalor.	August, 1901.
Sungkei, South Perak.	February, 1902.
Jeram Kawan, South Perak.	February, 1902.
Gedong, South Perak.	January, 1902.

Recorded from India, Ceylon, and Malacca.

142. Eulyes amoena

Reduvius amoena, *Guér. Ic. Ins.*, p. 350, pl. lvi, fig. 17 (1838).
Arilus amoenus, *Herr.-Schäff. Wanz. Ins.* vi, p. 91, fig. 662 (1842).
Eulyes amoena, *Amy. and Serv. Hém.*, p. 359, pl. vi, fig. 10 (1843); *Dohrn. Stett. Ent. Zeit.* xx, p. 93 (1859).

Sungkei, South Perak. February, 1902.
Gedong, South Perak. January, 1902.

Known from Java and Borneo.

143. Macranthopsis nodipes

Macranthopsis nodipes, *Reut. Act. Soc. Sc. Fenn.* xii, p. 283 (1881).

Jeram Kawan, South Perak. 13th February, 1902.

'Flying about in undergrowth, and closely resembling a small Hymenopteron.'

Found in Assam.

144. Euagoras sordidatus

Euagoras sordidatus, *Stål. Öfv. Vet.-Ak. Förh.*, 1866, p. 273.

Bukit Besar, Nawngchik. 2,500 feet. May, August, 1901.

'Flying about among long grass at dusk.'

Also received from Java and Borneo.

145. Euagoras plagiatus

Zelus plagiatus, *Burm. Nova Acta Ac. Nat. Cur.* xvi, *Suppl.* i, p. 303 (1834).
Euagoras plagiatus, *Stål. Stett. Ent. Zeit.* xxii, p. 136 (1861); *En. Hem.* iv, p. 24 (1874).
Darbanus nigrolineatus, *Amy. and Serv. Hem.* i, p. 371 (1843).

Jeram Kawan, South Perak. 14th February, 1902.

'Common among long grass and ferns in deserted clearings; flies about at sunset.'

Also found in Tenasserim, and in many islands of the Malayan Archipelago.

146. Endochus nigricornis

Endochus nigricornis, *Stål. Öfv. Vet.-Ak. Förh.*, 1859, p. 194; *Reut. Act. Soc. Sc. Fenn.* xii, p. 280 (1881).

Sungkei, South Perak. February, 1902.

Also received from Silhet and Java.

147. Astinus m-album

Ploeogaster m-album, *Amy. and Serv. Hem.*, p. 364, pl. 6, fig. 8 (1843).
Astinus m-album, *Stål. En. Hem.* iv, p. 22 (1874).
Ploeogaster modestus, *Stål. Öfv. Vet.-Ak. Förb.*, 1854, p. 238.

Jalor.

Somewhat common in Borneo.

148. Panthous daedalus

Panthous daedalus, *Stål. Ann. Soc. Ent. Fr.*, 1863, p. 42.

Semangko Pass, Selangor-Pahang boundary. 2,700 feet. May, 1902.

Originally described from Malacca.

149. Panthous icarus

Panthous icarus, *Stål. Ann. Soc. Ent. Fr.*, 1863, p. 42.

Mabek, Jalor. 25th July, 1901.

Originally described from Malacca.

150. Scipinia horrida

Sinea horrida, *Stål. Freg. Eug. Resa Ins.*, p. 262 (1859).
Sinea paltastes, *Dohrn. Stett. Ent. Zeit.* xxi, p. 406 (1860).
Scipinia horrida, *Stål. En. Hem.* iv, p. 15 (1874).

Mabek, Jalor. 26th July, 1901.

Recorded from Ceylon, the Philippines, and Japan.

151. Irantha biseratensis, sp. nov.

(Pl. XVI)

Reddish; ochraceous, abdomen beneath stramineous; head, antennae, rostrum, sternum, excluding lateral margins, lateral margins and apex of abdomen, piceous or black; abdomen above piceous, connexivum stramineous; head, with a long erect spine behind each antenniferous tubercle, remaining upper surface of head tuberculate, but not spinous; pronotum with the anterior lobe sculptured, posterior lobe moderately rugose; first joint of rostrum passing eyes, considerably longer than the second joint; femora strongly nodulose; anterior femora with two long piceous spines beneath, near apex.

Length, 10 mm.

NABINAE

152. Psilistus corallinus

Psilistus corallinus, *Stål. En. Hem.* iii, p. 109 (1873).

Telôm, Perak-Pahang boundary. 4,000 feet. 18th January, 1902.

Originally described from Borneo.

153. Nabis telomi, sp. nov.

(Pl. XVI)

Pale, metallic, grassy-green ; head, antennae, rostrum, body beneath and coxae pale ochraceous ; disc of metasternum and base of abdomen, carmine-red ; scutellum piceous, its apex ochraceous ; eyes and ocelli dull reddish-brown ; pronotum with three fuscous spots on posterior margin ; corium with the base luteous and a small fuscous spot near apex ; membrane pale fuliginous with a greyish oblong spot on inner and outer margins ; antennae with the basal joint green, remainder fuscous ; head with a central fuscous line on the anteocular portion, and a similar but shorter line on the postocular portion ; first joint of antennae almost as long as head and pronotum together, slightly shorter than the second ; legs distinctly and somewhat longly pilose.

Length, 6 mm.

Telôm, Perak-Pahang boundary. 4,000 feet. 19th January, 1901.

CAPSIDAE

154. Kosmiomiris lucidus

Capsus lucidus, *Walk. Cat. Het.* vi, p. 124, 294 (1873).

Kosmiomiris rubroornatus, *Kirk. Trans. Ent. Soc.*, 1902, p. 253, pl. vi, Fig. 6.

Bukit Besar, Nawngchik. 2,500 feet. 18th May, 1901.

'From low vegetation in swamp at the edge of jungle.'

Originally described from Sarawak.

Gulanerius, gen. nov.

Allied to *Kosmiomiris* from which it principally differs by the following characters :—The antennae are a little more robust, the first joint about the length of the pronotum, the second not quite the length of first, third and fourth short and slender, third longer than fourth, but together not so long as first ; head not distinctly longitudinally sulcate, as in *Kosmiomiris*, and the pronotum very much more obscurely punctate ; scutellum more elongate and much less callose.

155. Guianerius typicus, sp. nov.

(Pl. XVI)

Head, antennae, scutellum, clavus, and body beneath, black; base of first joint of antennae, abterior margin and posterior angular margins of pronotum, and a large elongate spot on apical area of scutellum, luteous; hemelytra hyaline, lateral margins of the coriaceous portion luteous, which has also a transverse apical and a transverse medial fuscous fascia; membranal venation fuscous; first joint of antennae, excluding base, and the posterior legs dull sanguineous; anterior and intermediate legs, luteous abdomen shrivelled in typical specimen.

Length, 7½ mm.

Bukit Besar, Nawngchik. 2,500 feet. 9th May, 1901.

'Hovering over flowers in jungle; flight and movements very wasp-like.'

156. Lygus biseratensis, sp. nov.

(Pl. XVI)

Pale obscure ochraceous, finely sericeous; apices of first, second, and fourth joints of antennae; eyes, a submarginal anterior line and a central longitudinal fascia to pronotum, black; cuneus fuscous brown; first and fourth, and second and third joints of antennae subequal in length.

Length, 7 mm.

Biserat, Jalor. July, 1901.

157. Lygus bukitensis, sp. nov.

(Pl. XVI)

Head, pronotum, scuttellum, body beneath, and legs, luteous; the pronotum and scutellum glabrous and somewhat greenish-ochraceous; corium ochraceous; clavus, excluding base and an oblique transverse spot at base, and apex of cuneus, dark fuscous; membrane very pale fuliginous, the venation fuscous; antennae black, basal annulation to first and second joints, luteous.

Length 5½ mm.

Bukit Besar, Nawngchik. 2,500 feet. 13th May, 1901.

'From among low vegetation on jungle floor.'

158. Disphinctus humeralis

Monolonion humerale, *Walk. Cat. Het.* vi, p. 162 (1873).
Disphinctus humeralis, *Atkins. Ind. Mus. Notes*, i, p. 4 (1889).

Bukit Besar, Nawngchik. 2,500 feet. 13th May, 1901.

Originally described from Malacca. Also found in Assam and in Sikkim, where it attacks cinchona.

159. Helopeltis bradyi

Helopeltis bradyi, *Waterb. Trans. Ent. Soc.*, 1886, p. 458, pl. xi, figs. 1, 2.

Bukit Besar, Nawngchik. 2,500 feet. May, 1901.

'Flying in clearing in the middle of the day, and on flowers. Perhaps bearing a generalized resemblance to an ant.'

160. Helopeltis cuneata, sp. nov.

(Pl. XVI)

Luteous; scutellar spine and a spot at its base, fuscous brown; cuneus and apical third of abdomen black; antennae with the first and second joints luteous, remainder fuscous; legs luteous; the femora, more distinctly posterior femora, with fuscous mottlings; membrane pearly-grey, the venation fuscous; scutellar spine almost perpendicular.

Length, 6 mm.

Bukit Besar, Nawngchik. 2,500 feet. May, 1901.

'From sweep-net in undergrowth.'

By the entomologist, who is not especially searching for the insects of this family, they are obtained quite accidentally either in the sweep net among low jungle vegetation or flying in the sun around flowers.

BELOSTOMATIDAE

161. Sphaerodema rusticum

Nepa rustica, *Fabr. Syst. Rhyng.*, p. 106 (1803).
Diplorhynchus rusticus, *Amy. and Serv. Hist. Hem.*, p. 436 (1843).
Sphaerodema rusticum, *Montand.*
Stoll., pl. vii, fig. 6.

Tanjong Patani, Jhering. 28th September, 1901.

'In small pools of fresh water in sand; very common.'

A wide ranging species throughout the Oriental and Australasian regions.

162. Amorgus indicus

Belostoma indica, *St. Farg. and Serv. Encycl. Meth.* x, p. 272 (1825).
Amorgus indicus, *Montand.*

Ban Sai Kau, Nawngchik. April and September, 1901.

'Large numbers of this big aquatic bug were brought to us by the natives at Ban Sai Kau, together with its eggs, which are laid in longitudinal clusters around the stems of reeds and stiff grasses at the edges of the rice fields. The insects and eggs are used as an article of diet by both Malays and Siamese.'

Very widely distributed throughout the Oriental region.

NEPIDAE

163. Laccotrephes ruber

Nepa rubra (rubra), *Linn. Mus. Lud. Ulr.*, p. 165 (1764); *Fabr. Mant. Ins.* i, p. 277 (1787); *Ent. Syst.* iv, p. 62 (1794); *Syst. Rhyng.*, p. 107 (1803).

Nepa grossa, *Fabr. Ent. Syst.* iv, p. 62 (1794).

Laccotrephes ruber, *Stål. Hem. Fabr.* i, p. 135 (1868).

Ban Sai Kau, Nawngchik. September, 1901.

EXPLANATION OF PLATES

RHYNCHOTA HETEROPTERA

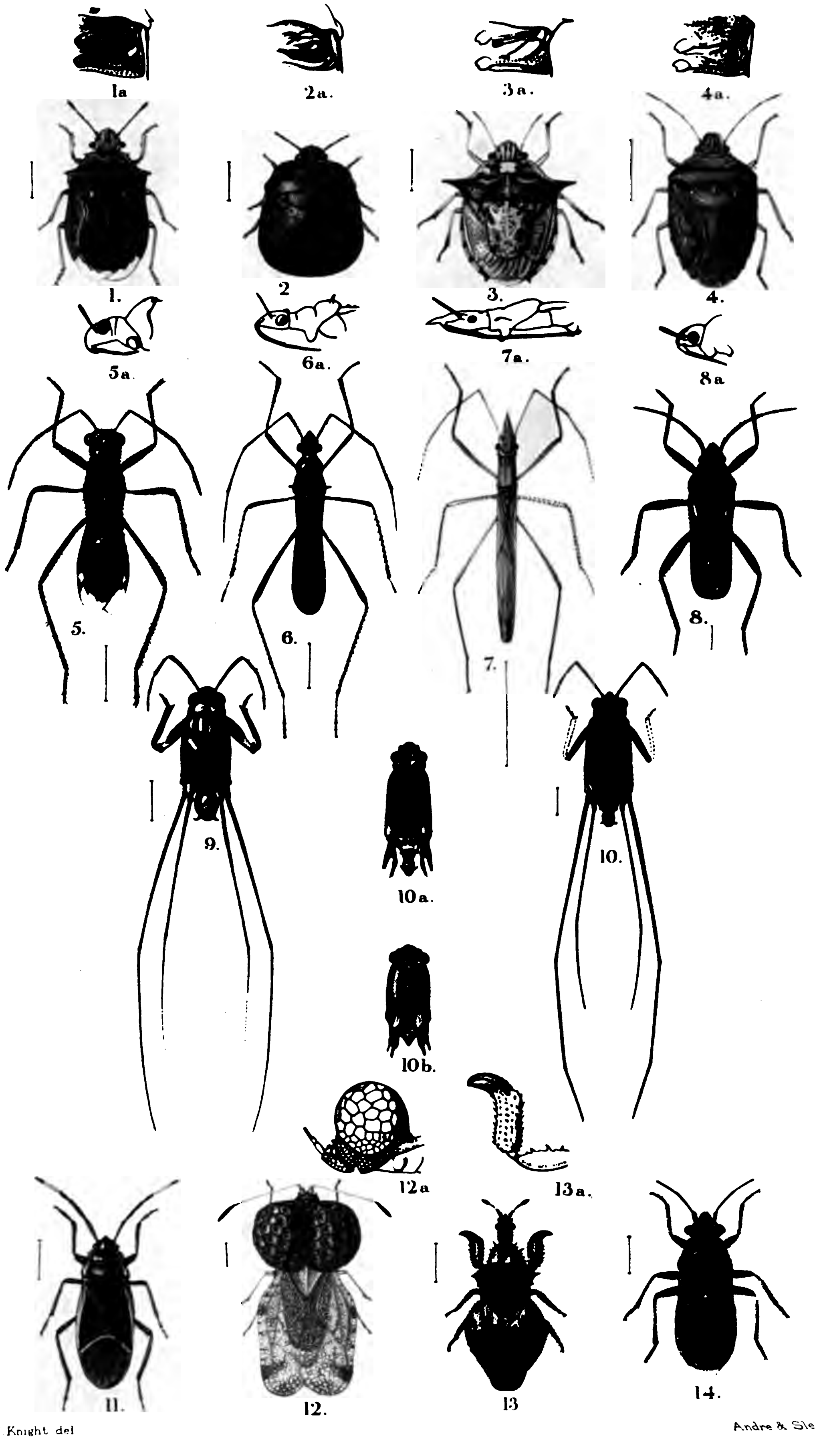
PLATE XV

Figs. 1, 1*a*. Podops malayensis
Figs. 2, 2*a*. Tropidotylus annandalei
Figs. 3, 3*a*. Stachyomia luteovaria
Figs. 4. 4*a*. Paterculus conspersus
Figs. 5, 5*a*. Artemidorus noctis
Figs. 6, 6*a*. Porta gracilis
Figs. 7, 7*a*. Acestra malayana
Figs. 8, 8*a*. Rhagovelia insignis
Fig. 9. Metrocoris nigrofasciatus
Fig. 10. Halobates sexualis
Fig. 10*a*. „ ♂
Fig. 10*b*. „ ♀
Fig. 11. Delacampius typicus
Figs. 12, 12*a*. Penottus jalorensis
Figs. 13, 13*a*. Carcinochelis determinatus
Fig. 14. Corizus robinsoni

PLATE XVI

Figs. 1, 1*a*. Ploiariola contaminata
Figs. 2, 2*a*. Luteva malayana
Figs. 3, 3*a*. Petalochirus fasciatus
Figs. 4, 4*a*. „ spinosissimus
Figs. 5, 5*a*. Alloeocranum maculosum
Figs. 6, 6*a*. Gerbelius confluens
Figs. 7, 7*a*. Arcesius bicolor
Figs. 8, 8*a*. Irantha biseratensis
Figs. 9, 9*a*. Nabis telomi
Figs. 10, 10*a*. Guianerius typicus
Figs. 11, 11*a*. Lygus biseratensis
Figs. 12, 12*a*. „ bukitensis
Figs. 13, 13*a*. Helopeltis cuneata

PLATE XV.



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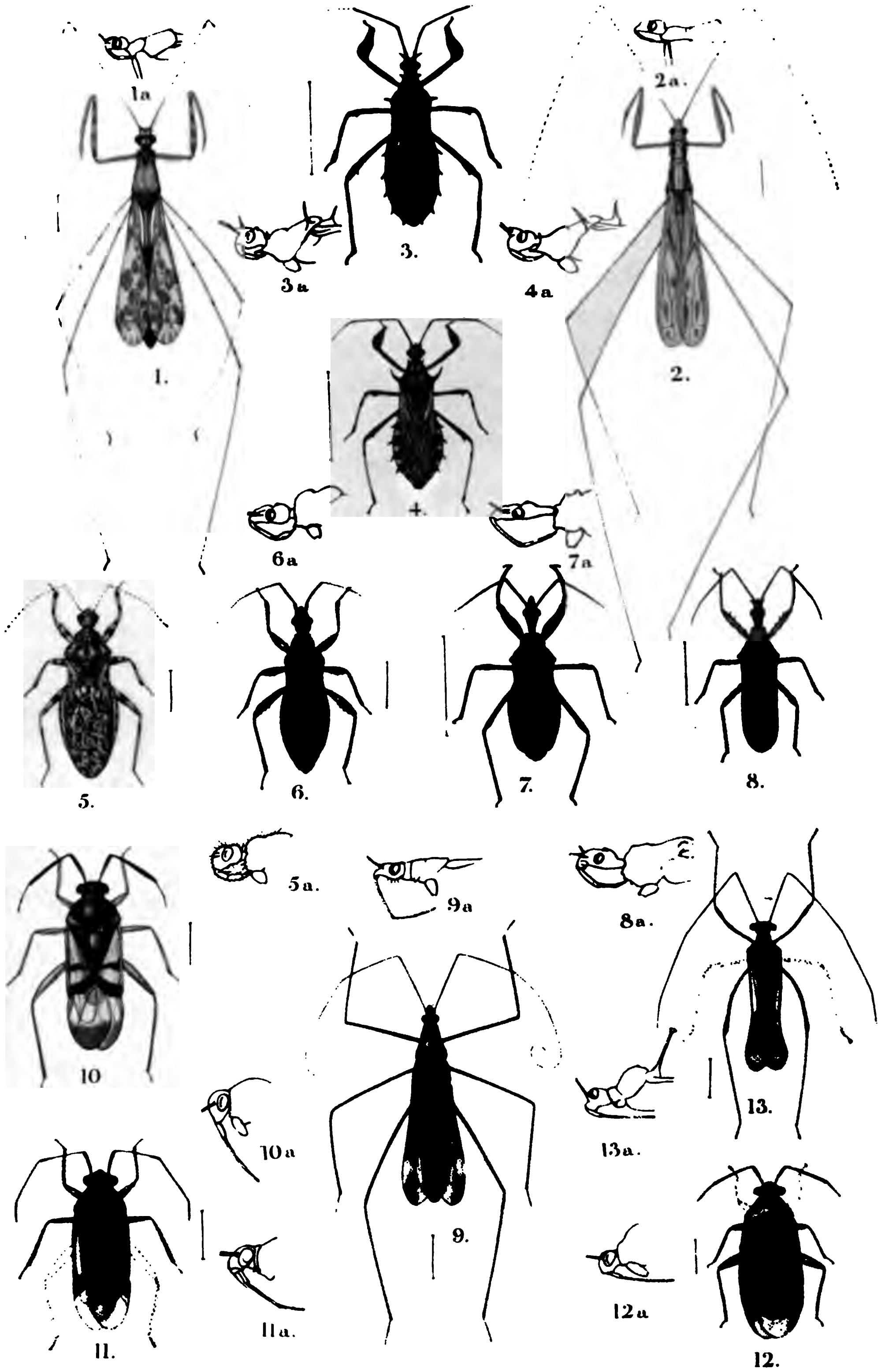
NEW SPECIES OF RHYNCHOTA

PLATE XVI.



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NEW SPECIES OF RHYNCHOTA

THE STRUCTURE AND MECHANISM OF THE FUNNEL SURROUNDING THE MOUTH IN THE TADPOLE OF MEGALOPHRYS MONTANA

By NELSON ANNANDALE, B.A.

THE STRUCTURE AND MECHANISM OF THE FUNNEL SURROUNDING THE MOUTH IN THE TADPOLE OF MEGALOPHRYS MONTANA

By NELSON ANNANDALE, B.A.

IN a note added to Mr. Boulenger's report on the Batrachia collected by Mr. Robinson and myself,[1] I remarked that the structure of the peculiar funnel surrounding the mouth in the tadpole of *Megalophrys montana*, Kuhl, a toad belonging to the family Pelobatidae, presented certain features of interest, and I now propose to record my observations on its anatomy and mechanism, making no attempt, for which I have not the materials, to treat it as a developmental entity or to search out its affinities in more or less closely allied forms. It is worthy of note, however, that while the Pelobatidae produce other instances of growths of a similar nature, these growths are merely characteristic of certain species, and that while *Megalophrys montana* has the funnel well developed in the larva, there is no trace of it either in the adult of the same species or in the tadpole of *Leptobrachium hasselti*,[2] Tsch., a form found in the same country under somewhat different conditions. It is not known at what stage in larval or embryonic life the funnel first commences to make its appearance in the former species, and all that I can say regarding its disappearance is, that in the young toad in which the tail is commencing to degenerate it is only represented by a small projection of the integument at the angle of the mouth on each side, whereas in the tadpole whose fore-limbs are just about to pierce the skin it is very nearly, but apparently not quite, as large in proportion to the rest of the body as at a slightly earlier stage of development.

During life, the funnel is capable of assuming two very distinct forms, according to the position of the tadpole[3] for the moment:—

(1) When the animal is hanging from the surface film, as it frequently does, this structure becomes a translucent rhomboidal or lozenge-shaped float, depressed in the centre towards the mouth, but otherwise nearly flat.

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[1] *Antea*, p. 132.

[2] Hanitsch, *Rep. Raffles Mus.* Singapore, 1897, p. 8.

[3] A very fair representation of the tadpole is given by Dr. Gadow (*Amphibians and Reptiles*, p. 60), but by comparing it with photographs taken from life, I find that the funnel is represented as proportionately too small.

(2) When, on the other hand, the animal is resting on the bottom, the float takes on the appearance of a pair of slender processes, deeply grooved along their upper surface, which represents the anterior surface of the funnel, conjoined at their broadest point over the mouth and curling upwards, like a pair of horns, behind the eyes.

As has been pointed out by Professor Max Weber,[1] who first described the tadpole, this change is brought about by muscular action, being due to a folding rather than a contraction of the structure, but Professor Weber's explanation of its exact mechanism does not appear to me to be correct, and to clear this point from misconception a reconsideration of the structure of the funnel in the light of the sectional method will be necessary. In discussing the funnel it will be convenient to speak of it as having a dorsal and a ventral wall, though these walls, as is readily demonstrated by a transverse section, are really quite continuous ; and each wall may be further regarded as having an anterior and a posterior surface, the latter being directed towards the bottom when the tadpole is floating, and the former applied to the surface film under the same conditions.

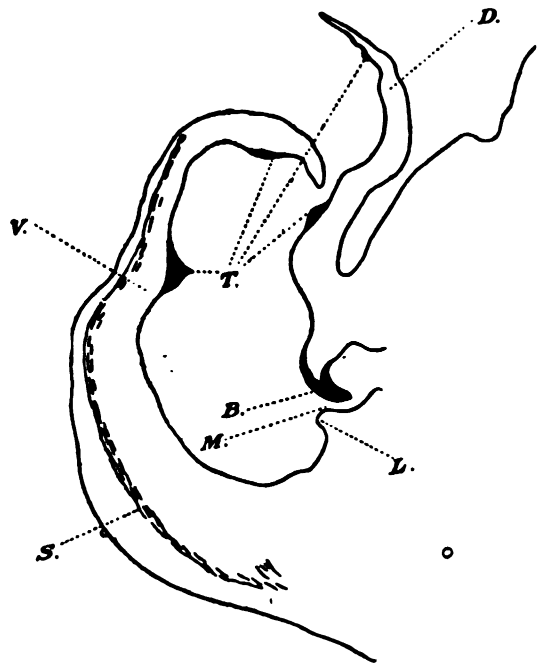

Fig. 1.

Fig. 1 represents the outlines of a median longitudinal section of the funnel in its folded condition, and was obtained from a specimen preserved in 2½ per cent. formol, which was later replaced by alcohol. It will be readily seen that the folding does not merely consist, as Professor Weber appears to have thought, of an approximation of the two walls to one another, for while the dorsal wall (D) lies back-wards along the dorsal surface of the head for some distance, and then curls upwards and outwards at its free extremity, the ventral wall (V), which is the longer and stouter of the two, runs almost directly upwards at its base, and then curls inwards at its free extremity towards the anterior surface of the dorsal wall. It is evident, therefore, that the folding of the funnel is due, in the first instance, to a bending upwards of the ventral wall, accompanied by a bending backwards of the dorsal wall, and that while the free extremity of the former naturally curls inwards, that of the latter becomes directed at its tip towards the same vertical line from the opposite direction. A very effectual guard to the mouth (M) is thus produced, being further elaborated by the arrangement of the horny teeth (T) situated on the anterior surface of the funnel.

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[1] *Ann. Jard. Bot. Buitenzorg*, 1898, Suppl. ii, pp. 5-10, figs. 1-5.

The dorsal wall of the funnel takes its origin in the same relative position as the upper lip of the tadpole of *Rana temporaria*. Inferior to it, a small horny upper jaw or beak (B), the outline of which is somewhat complicated in transverse section, protects the mouth (M), with which I am not concerned; beneath and immediately anterior to it an inconspicuous fleshy ridge (L) possibly represents the lower lip, and the ventral wall of the funnel appears as a hypertrophied structure, which may be produced, in its present condition, either by the growth round the mouth of the upper lip, or, as seems more probable from the mode of disappearance of the funnel, by a general alteration of the tissues in this region. The lower jaw, which is very large, is doubled backwards behind the beak, and is not included in the field of the figure, in which the posterior half of the upper jaw is also omitted.

Under a high power it is seen that the bulk of both walls consists of a vacuolated central mass, in which it is not possible to distinguish cell walls, though nuclei are abundant. The spaces in this central mass are true vacuoles, surrounded by anastomosing threads of protoplasm and devoid of blood corpuscles; in life, they appear to be filled with a colourless, amorphous jelly, which can be expressed from the funnel if it is violently squeezed.

Running in the central mass, accompanied by minute capillaries, are a number of slender strands of striped muscular tissue, which radiate outwards towards the periphery of the funnel. Professor Weber[1] figures their course as it is seen from above, but represents their ramifications as longer and more complicated than my sections would seem to indicate. They are more richly distributed in the ventral wall than in the dorsal, and, so far as I have been able to trace them, they originate from seven main branches, which all arise in a semi-circle below the mouth. The course of one of the strands is indicated in fig. 1, but it is not sketched direct from any one section, as it does not lie exactly, but only approximately, in the plane of the middle line. It runs, as will be observed, towards the posterior surface of the wall, and this seems always to be the case with the strands in both walls. Professor Weber states that contraction of these muscles causes the walls of the funnel to be drawn together, but, in my opinon, they have exactly the opposite function. Observations on the living tadpole have convinced me that the folded condition of the funnel is the condition of rest, and that its unfolding is due to a muscular effort, and I think it is evident that if the muscles have the course I have indicated, their contraction will cause the basal part of the funnel to become rigid, and therefore to unfold itself, while the free extremity is probably flaccid under all conditions, being forced to straighten itself by external pressure as the tadpole rises to the surface.

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[1] *Loc. cit.*

The epithelium which bounds the central mass is continuous with that of the general surface of the body, from which it differs in the absence of pigment granules and in its tendency, above, to form horny structures. It consists of small cells, five or six layers deep and generally approaching a quadrangular form ; their walls are well defined, their nuclei small. So far as I have been able to discover, there is no limiting membrane on the surface of the funnel. Blood vessels and blood sinuses do not occur in the epithelium, but it is possible to catch glimpses of minute branching nerves, which probably terminate, though I have not been able to trace them, in large, flask-shaped cells scattered singly on the surface. The latter are probably sensory in function, as their contents are not granular ; they have no connexion with the horny teeth.

The structure and arrangement of these horny teeth differ considerably from those of the teeth of *Pelobates fuscus*,[1] as well as the teeth of the Ranidae,[2] for they are not connected in any way with definite ridges or depressions, but radiate out along the anterior surface of the funnel, and they are not, even in a limited sense, unicellular. They arise, however, in the epithelium, appearing on the surface as minute, conical, non-serrated horny bodies, beneath which the epithelium is distinctly arched over a corresponding prominence of the central mass. In what appear to be young teeth, a group of cells, lying immediately over the central mass, can be distinguished by their thickened walls. Higher, the walls have become definitely cornified, and, higher still, the cell contents are invaded by anastomosing filaments of horn, which originate in the now completely horny walls. These filaments grow thicker and more complicated, until, finally, the protoplasm is completely obliterated, and the cell limits disappear in a uniform horny mass, the conical outline of which is regulated by the fact that a greater number of cells is infected by the corniferous stimulus or material in the deeper layers of the epithelium than on the surface. A continuous growth from below takes place, so that the tooth, as it is worn away on the surface, is supplied, gradually and without break, with fresh substance. The process of growth can be observed very clearly in a series of longitudinal sections of the same individual, but in the material at my disposal the teeth are all more or less fully developed, and their exact origin cannot, therefore, be ascertained.

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[1] E. Gutzeit, *Zeitschr. wiss. Zool.*, vol. XLIX, 1889, p. 50, pl. II, figs. 30-32.

[2] *Ibid*, p. 46, and E. Schulze, *Abhandl. Konigl. Preuss. Akad.* 1888.

The action and movements of the funnel have already been noted in brief, but we are now in a position to discuss them a little more fully. In the first place, the absence of vascular tissue of blood vessels, except for the capillaries which accompany the muscles, proves that it is not, in the ordinary sense, an accessory breathing apparatus ; but possibly it may be connected indirectly with the oxygenation of the blood. On three separate occasions I have taken the larvae of *Megalophrys montana* in a small muddy pool, which was liable, on the one hand, to dry up altogether, and, on the other, to become part of a rapid torrent, generated by a single heavy shower ; and it is obvious that in such a torrent an animal which can float lightly on the surface, as the tadpole does with its funnel, will be in a very much better position to obtain oxygen than one which is being hurried along among the mud and debris near the bottom. The tadpole of *Rana larutensis*,[1] Blgr., which also inhabits mountain streams in the Malay Peninsula, and those of several other species, are provided for the same emergency in a different way, bearing on their belly a large sucker, which prevents them from being washed away at all and allows them to cling to the rocks of the most rapid torrent. The tadpoles of *Leptobrachium hasseltii*, on the other hand, have no special need for any apparatus of the kind, for they are found, so far as my own experience of them goes, in deep pools at the edge of streams in level country, and they only rise to the surface occasionally. The main function of the funnel, then, is to act as a float, and, very probably, to protect the mouth of the tadpole from the entry of noxious organisms when it it burrowing in the mud, as drought causes it to do. It is possible also that it assists in the capture of the minute plants and animals on which the species feeds, though I can give no direct evidence for this function. If the tadpole is watched when it is hanging from the surface film, it will be remarked that the float is constantly expanding and contracting, owing to the respiratory movements of the mouth, and that, although the movements are too gentle to overcome the friction produced by the body and tail, which hang more or less vertically downwards in the water, and so to cause the animal to progress in one direction or another, they produce distinct currents on the surface, which bring towards the mouth any minute particle which may chance to be floating in its vicinity. Every now and then, without apparent cause, the tadpole sinks, and lies resting on the bottom for some little time before re-ascending to the surface. Photographs, which I was so fortunate as to obtain, show that the surface film is perceptibly raised over the whole area of the float, owing to upward pressure of the body, and when the tadpole sinks a regular vortex is caused, down which floating particles are hurried. At the moment of sinking the animal permits the funnel to fold itself, indeed, it is this action which causes it to sink, and it is quite conceivable that some of these particles may be enclosed in the folded funnel and so conveyed to the mouth; a glance at Fig. 1 will show how difficult it would be for them to escape, were they once properly engulfed.

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[1] Laidlaw, *P.Z.S.*, LXXXVIII, 1900, p. 886, pl. LVII, figs. 3, 4.

The function of the horny teeth is a difficult question, for their divergence in structure from the type apparently normal in frogs and toads shows clearly that they are not mere vestigial structures. Dr. GADOW[1] suggests that they are used for rasping the under surface of the leaves of water plants, but I am obliged to disagree with this suggestion for the following reasons :—(1) The habitat of the tadpoles is not one suitable for the growth of water plants; (2) I have never seen the funnel unfolded completely except when it was in contact with the surface film, and, although the under surface of floating leaves might well take the place of the surface film, I do not think that the muscles would permit a rasping action, for which the plain conical teeth would be far less efficacious than if they were serrated in the typical manner, and (3) the food of the species, judging from the contents of the alimentary canal in several specimens, does not consist of rasped leaves. I cannot offer any observations on the exact function of the structures, but I would suggest that one or more of three functions are possible :—(1) They may serve to strengthen the funnel when it is in use as a float, (2) they may increase its surface area and so make it more powerful, or (3) they may serve as additional factors in the retention of nutritious particles within the funnel, and in preventing the entry of harmful organisms or substances.

It only remains for me to express my thanks to Professor J. COSSAR EWART for the use of his laboratory in working at the material upon which this paper is mainly based.

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[1] *Loc. cit.*

HELIOCOPRIS MOUHOTUS AND DOMINUS

By D. SHARP, M.A., F.R.S.

INTRODUCTORY NOTE

THE great majority of the specimens on which Dr. Sharp comments in the present paper, were obtained during a few days in October, 1901, at Biserat. On other occasions single specimens, or, more often, a male and a female together, were brought us by natives, who said that they had found them on elephant dung. The cause of their abundance at Biserat, during the few days mentioned, appeared to be that a large train of elephants, in whose droppings they were taken, had just come to the village.

I was not quite right in stating in a former paper[1] that only the male of *Heliocopris mouhotus* can stridulate, for I find that the female is also able to emit a sound, though less readily. The bat-like squeak appears to be produced by the action of the legs in their sockets—I think only the intermediate pair—and can be brought about in specimens lately killed by moving the legs and at the same time pressing them in towards their base.

NELSON ANNANDALE

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[1] *P.Z.S.*, 1900, p. 862.

HELIOCOPRIS MOUHOTUS AND DOMINUS

By D. SHARP, M.A., F.R.S.

CAMBRIDGE, NOVEMBER 12, 1903

THESE two forms of Copridae are amongst the largest of insects, and yet very little is known about them. In consequence of this, and also, perhaps, of a mistake made by the late Signor Fea, the idea has arisen that the two names are merely synonyms. Although this is not the case, it is probable that the two are really one species, for though it is not quite certain, I think it highly probable that *H. mouhotus* is a discontinuous variety of *H. dominus* which is only produced in certain localities and under certain conditions.[1]

The following are the chief points that have been ascertained. In 1868, the late H. W. Bates described[2] *Heliocopris domina* from Assam. He distinguishes two forms; a large male having four horns or prominences on the head, and a smaller male differing chiefly in having the horns of a smaller size and the sexual protuberance of the thorax smaller. The female was not known to Bates.

In 1878, I described *Heliocopris mouhotus* from Cochin China.[3] In this case I had three forms before me; a large form of the male having two horns on the head, and a great sexual protuberance on the thorax; a smaller male destitute of the two large horns, but having a transverse central elevation on the head, the extremity on either side being prolonged and acute; the female was described as possessing the structure of the head usual in that sex in the genus.

In 1897, the late Signor Fea figured the large male of *H. mouhotus*, calling it, however, *H. dominus*, Bates.[4] Since then little has been written about these insects, but I have received letters enquiring whether *H. dominus* and *H. mouhotus* are the same thing or not.

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[1] The French biologists object to the term 'discontinuous' and prefer 'abrupt' ('*brusque*'), and I think are right in this.

[2] *Col. Hefte* IV, p. 88.

[3] *Ent. Mo. Mag.* XV, p. 155.

[4] Fea, *Viaggio Zool.* in *Birmania*, p. 168.

Messrs. Annandale and Robinson have now brought from the Malay. Peninsula a series of twenty-four individuals of *Heliocopris*, which, after repeated examination, I believe to be all one species, and the one I described as *H. mouhotus* There are eight females, three large males agreeing with the large male of *H. moubotus* (as previously known), in addition to three other males[1] which agree sufficiently well with the male type of *H. dominus*, Bates, to make me feel doubtful whether they are distinct therefrom.

By the kindness of my friend, M. Rene Oberthur, of Rennes, I have also before me eleven other specimens of these forms from Siam, Upper Burma, Rungpore, and Trichinopoly. They include the types of *H. dominus* and *H. moubotus*, and, on the whole, confirm the opinion I am now putting forward, that the two are really only one species.

There is, however, one point of considerable interest to which I must call attention, viz., that there are no specimens intermediate between the two-horned large form (fig. A) I called *H. moubotus*, and the four-horned large male, Bates called *H. domina* (fig. B). If, therefore, I am correct in considering all the forms to be one species, it would appear that the form A is a very remarkable case of abrupt variation. It is, indeed, difficult to see how there could be a form intermediate between the A and B of our figures. C is clearly only a diminished or depauperated form of B. But B could only be made into A by pushing the two middle horns apart from one another, so that each became joined to the lateral horn on the same side, thus making two thick horns instead of four smaller ones.

I imagine that something of this kind really happens in the course of the ontogeny of the large two-horned individuals, and if so, it is clear that not only have we at present no intermediate between the two forms, but also that we are not likely to find such, except as teratological specimens in which the coalescence of the horns is arrested before it is completed.

I may remark that we know nothing as to the Natural History of these large forms, though I am informed by Mr. Annandale that they frequent the dung of elephants.

The localities for the specimens of Messrs. Annandale and Robinson are both near Patani, viz. :—

Ban Sai Kau, Nawngchik.	May, 1901.
Biserat, Jalor.	October, 1901.

I may add that I have hesitated much about coming to a decision in this question, and that the evidence as to the conspecificity of *H. dominus* and *moubotus* is not quite convincing, because of the fact that few individuals of

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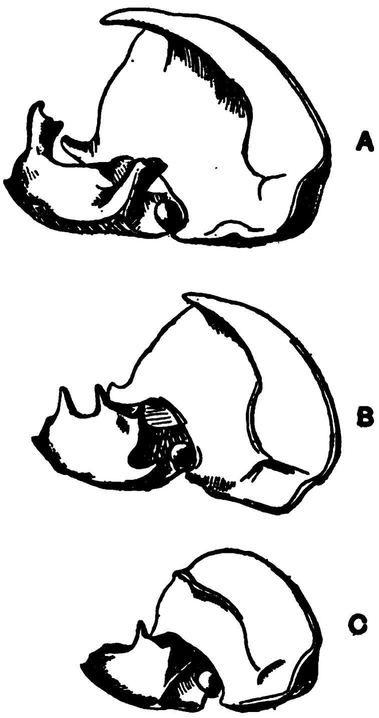
[1] The other ten males are of less perfect development, and do not contribute any important evidence.

H. dominus are extant in collections. M. Rene Oberthur is of opinion that *H. moubotus* and *H. dominus* may prove to be distinct species. If so, we have a case that as regards variation is very remarkable ; because the females, small males, and moderate males of the two forms (or species) are very much alike, while the large males of the two are not similar. M. Oberthur has specimens that he considers to be *H. dominus* from Assam, Upper Burma, Rungpore, and Trichinopoly, these being some of the examples I have previously mentioned. This suggests a different distribution for the two forms, *H. dominus* occurring on the continent of India, and *H. mouhotus* in Cochin China, Siam, and the Malay States. If this difference in distribution should prove to be real (and not due merely to the small number of specimens that have been collected), it will be strong evidence in support of the distinctness of the two forms. Perhaps the life-histories may elucidate the question, but as to this very little is, I believe, known.

If it should prove that there are two species, the evidence goes to show that the abrupt variety that I have described in *H. mouhotus* does not occur in *H. dominus.*



Heliocopris mouhotus ♂ *Scale:* $\frac{1}{1}$

A = major-form. B = minor form. C = third form.

MARINE FISHES

By J. JOHNSTONE, B.Sc.

INTRODUCTORY NOTE

IN introducing the present paper it should be explained that, with the exception of the *Gobiidae*, which are of considerable bionomic interest, we made no serious attempt to collect marine fish at Patani or elsewhere. The few that we sent home are either of ethnographical importance or were purchased casually in the market or from fishermen, to fill up space in a vessel containing other specimens. Fishing is the principal industry of Patani, and the bay should prove an excellent collecting ground for shallow-water forms ; the number that could be obtained with a little trouble would certainly be very large. Fishing is carried on mainly in three ways :—by means of large shrimping-nets, worked either by one man or by two, in water not more than four feet deep ; by long drift-nets, which are laid some distance out to sea, where there is as much as thirty fathoms of water ; and by seines, sometimes as much as two or three hundred fathoms long, which are used both on the seaward beach of Cape Patani, where there is an evenly sloping bottom of hard sand, and from little boats in the bay, where the bottom is muddy and the nets are shorter. The marine gobies in our collection were either shot with a collector's gun or caught for us by little boys, while the other specimens came mostly from the seines or the drift-nets.

HERBERT C. ROBINSON

REPORT ON THE MARINE FISHES

By J. JOHNSTONE, B.Sc.

THE marine fish collected by Messrs. ANNANDALE and ROBINSON on the coast of Patani and Jhering, belong to the following species :—

SQUAMIPINNES

1. Chaetodon (?) sp.

I refer to this family three small fishes, 1 cm. and less in length, which were caught on the surface in the estuary of the Jambu River.

They are oblong and compressed, and the head is heavily armed with bone. There is a long and stout post-frontal spine, and another smaller spine at the inferior angle of the operculum. The skin is apparently scaleless, but is covered with minute spines. The dorsal fin has eleven spines, followed by eighteen rays ; the anal has four stout and pointed spines and sixteen rays. The fish resembles *Tholichthys*,[1] but is certainly a different form. It is probably the young of a species of *Chaetodon.*

'Little fish similar to the above are not uncommon in the Jambu estuary, generally swimming near the surface in companies of three or four.'

SCORPAENIDAE

2. Scorpaenopsis oxycephala, (Blkr.)

Scorpaena oxycephalus, *Blkr.*, *Sclerop.*, p. 20.

'Probably from sunk rocks outside Patani bay.'

SCIAENIDAE

3. Sciaena belengeri, (C. and V.)

Corvina belengeri, *Cuv. and Val.*, v, p. 120.

4. Sciaena glaucus, Day

Sciaena glaucus, *Day*, *Fishes India*, p. 192, pl. xlvi, fig. 2.

5. Otolithus maculatus, Cuv.

Otolithus maculatus, *Cuv.*, *Règn. Anim. Poiss.*, vol. xxvii, fig. 2.

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[1] Günther, *Ann. Mag. Nat. Hist.*, 1868, p. 457.

TRICHIURIDAE

6. Trichiurus savala, C. and V.

Trichiurus savala, *Cuv. and Val.*, viii, p. 251, pl. 244.

7. Trichiurus haumela, (Forsk.)

Clupea haumela, *Forsk.*, p. 72.

'These two species are known at Patani as *Ikan lelayang*,[1] and form the object of a cult among certain Malay families.[2]

CARANGIDAE

8. Caranx nigripinnis, Day

Caranx nigripinnis, *Day*, *Fishes India*, p. 225, pl. li, fig. 5.

9. Chorinemus moadetta, C. and V.

Chorinemus moadetta, *Cuv. and Val.*, viii, p. 382.

One specimen obtained differs, in some respects, from DAY's description.[3] The spines of the first dorsal fin are slightly flattened and overlap each other. The first is recumbent and directed forward ; it is very small and almost concealed by the skin. There are seven free spines in addition to this concealed one. The second dorsal fin has one spine and twenty rays, and the anal has two spines and twenty rays. The height of the body is contained four-and-a-quarter times in the total length. The skin is thick and leathery ; the scales are very small and are invisible even to a hand lens ; they lie in longitudinal rows with their ends overlapping. Their longitudinal diameter is ten times that of the transverse. They are blunt at one end and pointed at the other.

One specimen, four inches long.

10. Equula ruconius, (Ham. Buch.)

Chanda ruconius, *Ham. Buch. Fish. Ganges*, pp. 106, 371, pl. xii, fig. 35.

'Very numerous. The individuals of this species swim in shoals of about thirty or forty, being very common in the brackish water of the Jambu and Patani estuaries. They are continually leaping from the surface together, and cause brilliant flashes of luminescence by their movements at night. The fishermen catch them in order that they may form an ingredient of *blachan*—a malodorous Malay relish made of all kinds of small fish and crustaceans, pounded up, half cured in weak brine, and allowed to become putrid.'

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[1] The word *lelayang* in the Patani dialect = *layang-layang* (swallow, swift, or toy kite) in more correct Malay, just as *lelagu* (*antea*, part I, p. 147, note) = *lagu-lagu*, and *kakachang* (*postea*, fish, no. 19) = *kachang-kachang* (peas or lentils). N.A.

[2] *Fascic. Malay.—Anthropology*, part I, pp. 74-76.

[3] Day, *Fishes India*, p. 230, pl. liii, fig. 1.

11. Lactarius delicatulus, C. and V.

Lactarius delicatulus, *Cuv. and Val.*, ix, p. 238, pl. 261.

'The *Ikan lemuk* (fat fish) of the Patani fishermen ; also the centre of a family cult.'[1]

SCOMBERIDAE

12. Scomber brachysoma, Blkr.

Scomber brachysoma, *Blkr. Makr.*, p. 236.

TRACHINIDAE

13. Silago sihama (Forsk)

Atherina Sihama, *Forsk.*, p. 70.

GOBIIDAE

14. Apocryptes lanceolatus, (Blkr. Schn.)

Eleotris lanceolata, *Blkr. Schn.*, p. 67, fig. 15.

Two specimens from the Jambu estuary.

'This is the least terrestrial of the mud gobies which we saw in Malaya, and is obviously less highly specialized for an amphibious life than any species of *Boleophthalmus* or *Periophthalmus* ; but it frequently wriggles along the mud some yards away from the water, and its powers of "walking," or rather hopping, on land, though less well-developed than those of its allies, are by no means absent. At the mouth of the Patani River, at dead low tide, numerous individuals line the water's edge, and by some muscular effort raise their heads and bodies into the air almost vertically, remaining poised, as if standing upright on their tails for an instant, and then falling prone on the liquid mud. This curious manoeuvre, probably executed in attempts to capture flies, causes a peculiar sound, which can be heard all along the shore.'

15. Periophthalmus koelreuteri (Pall.)

Gobius koelreuteri *Pall.*, *Spic.* vii, p. 8, vol. 2, fig. 1.

Eight specimens, one-and-a-half inches to three inches long.

First dorsal = 10-14 ; second dorsal = 13-14 ; anal = 11. Pelvic fins in every specimen completely separate.

'*P. koelreuteri*, at any rate in youth, appears to prefer mud of a rather firmer consistency than that affected by *P. phya*, and to enjoy climbing on roots and stones, the difference in its habits rendering it comparatively easy of capture. We can neither confirm nor disagree with Professor Hickson's view, that this species sits with its tail in the water, oxygenating its blood by means of the highly vascular tissues of this organ, and we have no reason to think that it constructs a burrow or nest; but it must be remembered that all the individuals of this species which we observed were probably immature. The young are common, together with those of the succeeding species and of several of *Boleophthalmus*, a mile-and-a-half up the Patani River from the sea, in brackish water among the roots of sago and nipa palms, and it is probable, judging from the analogy of other forms, that they go further up stream than the adults. The eyes did not seem to us to be so prominent in life as those of specimens of *P. koelreuteri* from West Africa, which we have seen in the aquarium of the Free Public Museums in Liverpool and the gardens of the Zoological Society of London.

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[1] *Fascic. Malay.—Anthropology, loc. cit.*

18. Periophthalmus phya[1], sp. nov.

(Pl. XIV)

This form resembles *P. schlosseri*, but appears to differ in (1) the complete fusion of the pelvic fins in both young and adult specimens; (2) the number of rays in the pectoral fins; (3) the number of rays in the caudal fins, and (4) the larger size of the specimens obtained.

The length of the head is contained four times, and the height of the body five and two-thirds times, in the extreme length. The cleft of the mouth is continued back to about the middle of the orbit; the upper jaw projects slightly; the snout has a very prominent fleshy fold, at either extremity of which are situated flattened, pointed, nasal tentacles with the nostrils at their extremities. In the upper jaw there are three or four large pointed and slightly curved teeth on either side of the symphysis, with eight or nine much smaller conical ones at each side in a single row. In the lower jaw there are ten to fourteen teeth on each side, smaller than those at the centre of the upper jaw, and becoming smaller posteriorly; all the teeth in the lower jaw are vertical. Teeth are frequently wanting close to the mandibular symphysis. The upper and lower lips are covered with small, low papillae or tubercles.

The first dorsal fin contains from seven to nine flexible spines, the first of which is the longest, and is about half the length of the head; the second dorsal has thirteen to fourteen rays, and the anal twelve to thirteen rays; the pectoral has seventeen to eighteen, and the caudal eighteen to nineteen rays. These numbers represent the extreme variability in nine large individuals, from ten to twelve inches in total length. The pelvic fins are fused throughout their entire length in all these specimens.

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[1] *Phya* is a high Siamese title.—Edd.

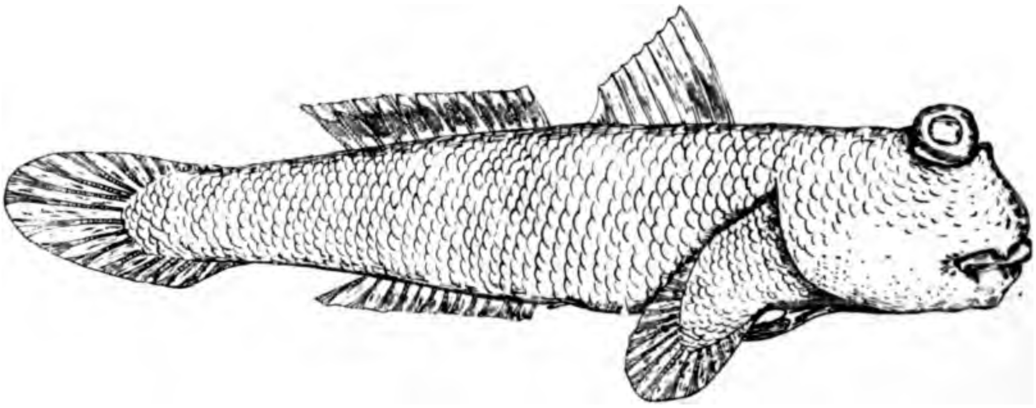

Fig. 1. PERIOPHTHALMUS PHYA, SP. NOV. Scale, ½.

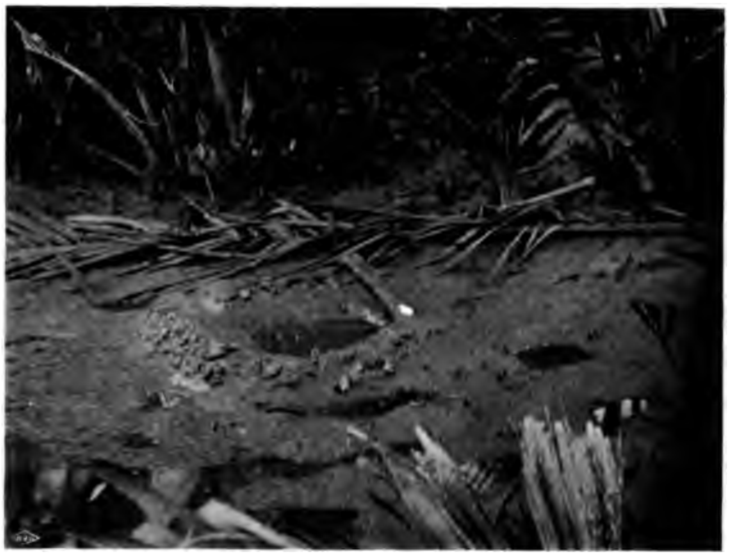

Fig. 2. BURROW, showing rampart of mud pellets.

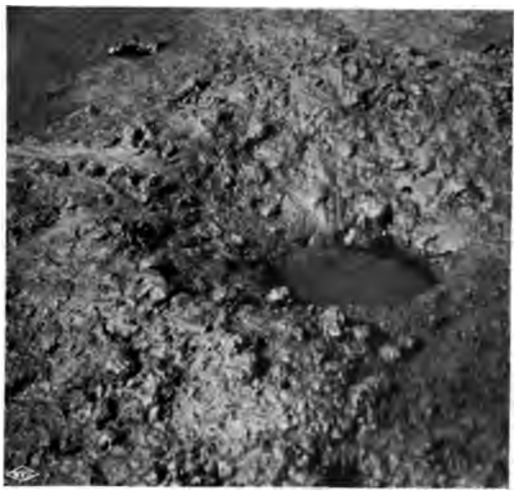

Fig. 3. BURROW, with tracks of *pectoral fins.*

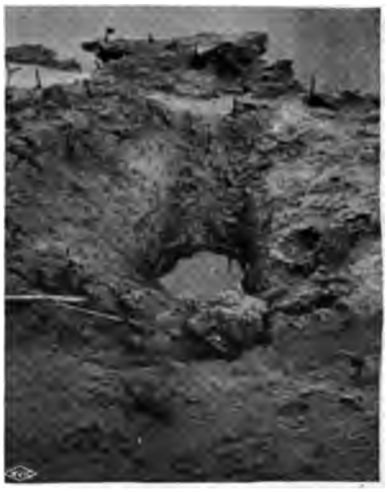

Fig. 4 BURROW, after obliteration of rampart by tide.

The scales are indistinct on the head in front of the eyes; they are distinctly visible on the rest of the body. The lateral line is indistinct, but there are fifty-five to fifty-eight scales in a longitudinal row from the upper base of the pectoral fin to the tail. There are about fifteen scales in a transverse row at the beginning of the first dorsal fin.

About half-a-dozen smaller specimens of this form were obtained, varying from four-and-a-quarter to six-and-a-half inches in length. In all these the fin formula is similar to that of the larger specimens, except that the number of rays in the caudal fin is greater (nineteen to twenty-two). The pelvic fins are completely fused in every instance.

Three still smaller specimens I also include in this species. They are from two to two-and-one-eighth inches in total length; the length of the head is contained four-and-a-half times, and the height of the body six-and one-third times, in the extreme length. The fin formulae are :—

$$D=6/12\text{-}14\ ;\ A=13\text{-}14\ ;\ P=16\ ;\ C=25\text{-}29.$$

The pelvic fins are completely fused in these specimens also. There are forty-five to fifty scales in a longitudinal row. There are three large curved teeth on either side in the upper jaw near the symphysis, with fifteen to eighteen smaller ones in a single row. The lower jaw contains four caniniform teeth on each side of the symphysis, and seven to eight smaller ones directed vertically.

'*Periophthalmus phya*, at any rate in the adult state, has a more sober coloration in life than several of its allies, which are conspicuously dotted with pale blue spots, for it is of an almost uniform dark fuscous shade. Its head and body are covered with a very thick layer of mucus, which probably prevents the too rapid evaporation of moisture from its tissues—an important matter in so large an amphibious fish.

Very probably the species occurs in the West Coast estuaries of the Peninsula, for burrows similar to the ones it forms are common on the mud flats at Port Swettenham, in Selangor. The adults are very abundant in the immediate vicinity of the town of Jambu, where a large area of semi-liquid mud is exposed at low tide, but their wariness renders them difficult of approach, especially at half-tide, when they do not appear to have settled down to a terrestrial existence. They seem to be very sensitive to cold or fog, and do not come out on the mud-flats early in the morning, even at low tide. When the sun is well up, however, they skip about many yards away from any water, and quite careless as to whether their tail or any other part of their body can be kept wet, even when the temperature is so high that sand becomes too hot for a European to walk upon it with bare feet.'

RADIAL FORMULAE OF *Periophthalmus phya*

Extreme length	Spinous dorsal	Soft dorsal	Anal	Pectoral	Caudal
10 inches to 11½ inches	8	13	13	17	17
	8	13	13	17	19
	8	13	13	17	19
	7	13	13	17	21
	8	13	13	17	21
	9	13	13	16	20
	8	13	13	16	20
	8	13	13	16	19
	8	13	13	17	19
9½ inches ...	8	13	13	17	20
6¾ inches ...	8	13	13	17	23
6¼ inches ...	8	12	12	17	22
5¾ inches ...	7	13	13	17	21
4½ inches ...	8	13	13	17	23
2 inches to 2⅛ inches	6	14	14	16	29
	6	12	13	16	25
	6	Injured	14	16	28

In all these specimens the pelvic fins are completely fused.

Localities—Estuaries of Jambu and Patani Rivers.

'A most important feature in which the habits of the present form differ from those of its congeners is that it constructs a more or less permanent burrow, in which it takes refuge when alarmed and remains in bad weather. Whether this burrow is also used as a nest we cannot be sure, but it appears to be frequented by individuals of both sexes, and the natives say that the female deposits her eggs in smaller holes made for the purpose. The main entrance to the large burrows (Pl. XIV) is always more or less funnel-shaped and slanting, and lies in an oval or circular pool of water, which is retained round it as the tide sinks—for it is always made between tide-marks—by a rampart of mud some four to six inches in height, and about a foot-and-a-half in diameter. It is surrounded, outside the rampart, by a number of simple holes, which probably lead into the central shaft, though, owing to the liquid condition of the mud, we were unable to demonstrate this by digging. When thoroughly alarmed, the fish sometimes enters one of these holes, but if only a little scared, it rushes to the rampart, surmounts it, and sits for a longer or shorter period on it before diving into the pool and disappearing. It seemed quite evident to us that each individual had its proper burrow, but how many inhabited one burrow we could not ascertain; it appeared that their number must be small. The central pool was always entered at one point, so that a definite furrow was made on the rampart, and the characteristic tracks of the fish—consisting of a central line (made by the tail) and two series, running parallel to one another on either side of the line, of more or less hand-shaped depressions (made by the tips of the more prominent pelvic rays and the web between them)—converged towards it, showing readily whether the fish had recently gone out or in.

At first we were much puzzled as to how the rampart and burrow were made, but the natives told us that the fish wriggled down into the mud, filled its mouth with the stiffer clay beneath the surface, and built up the wall with pellets thus brought from below. We found it impossible to confirm their statement by actual observation, but there is every reason, in this case, to regard them as accurate observers, for the colour of the walls plainly showed that they were not made of surface mud, while the shape and size of the pellets, which could easily be distinguished in freshly constructed specimens, were just what would have been expected had they been casts of the inside of the mouth of an adult of *P. phya*; nor did we ever see a small specimen enter one of the burrows. One of us watched a large individual repairing its rampart, which had been injured by the tide, for some time, but could not be sure exactly how this was accomplished; the fish certainly went down the central hole and returned in a few seconds, bringing a pellet of mud with it.

The eyesight of this species appears to be keen, both in air and water, and to range in the former element for a radius of at least thirty feet. We noticed repeatedly that when we had frightened an individual into its burrow, it remained concealed as long as we stayed still, but reappeared as soon as we began to move away; and this would seem to indicate that the fish could see from beneath the surface of the water what was going on in the air. On land, at any rate, it is absolutely deaf, and Robinson found, when shooting specimens, that those which were not hit took no notice whatsoever of the report of the gun, and only moved when the shot spattered them with mud.'

17. **Boleophthalmus viridis** (Ham. Buch.)

Gobius viridis, *Ham. Buch.*, *Fish. Ganges*, pp. 42-366, pl. 32, fig. 12.

$$D = 5/26\ ;\ A = 26.$$

One large barbel under the symphysis of the lower jaw, and a row of five much smaller ones on each mandibular ramus ; four to six barbels on the upper lip.

Two specimens, about four inches long.

18. **Boleophthalmus pectinirostris** (Gmel. Lim.)

Gobius pectinorostris, *Gmel.*, *Linn.* i, p. 200.

The third spine of the first dorsal fin is the longest ; its length is twice the height of the body at the origin of the spinous dorsal fin. The other spines of the first dorsal have also filamentous extremities. There are six oblique dark bands (in spirit) on the body behind the origin of the first dorsal fin.

One specimen, seven inches in total length.

19. **Boleophthalmus boddaerti** (Pall.)

Gobius boddaerti, *Pall.*, *Spic.* viii, p. 11, pl. 2, figs. 4-5.

A number of specimens from two-and-a-half to seven inches in total length ; one specimen with four spines in the first dorsal fin.

'The species of this genus do not differ from one another to any great extent in habits. The present form, which is the commonest at Jambu, hops about, like *P. phya*, in the hottest sunshine, and appears to make a permanent burrow, which, however, is of a very simple nature, devoid of a surrounding rampart. When alarmed it frequently wriggles, tail foremost, into the mud, and this would seem to be the way in which its holes are commenced. Its food, and probably that of *P. phya*, is largely of a vegetable nature, and we have watched it browsing on a minute green alga that closely covers the surface of the mud-flats at certain points. Unlike *P. phya*, it carries its dorsal fin rays elevated in the air. This gives it a very distinctive appearance as the web of the fin is dotted with conspicuous blue spots. Possibly the fin aids it in its terrestrial progress, like the sail of an ice-boat, as the rays are lowered so as to lie prone whenever it passes through a pool of water even too shallow to wet its dorsal surface ; in such conditions a sail might cause it to topple over. The adults are very pugnacious, and if two individuals happen to meet face to face, a hostile demonstration always takes place; they rush together, raising and depressing their dorsal fins with great rapidity, but do not appear to injure one another in any way, and soon part and continue their course.

The chief vertebrate enemies of the "walking" fish in the Patani States are fishing hawks, monitor lizards,[1] and possibly others.'

The Malays call the fish of this and the preceding genus *Ikan timbakul*—a name of very doubtful significance, as the native story[2] which attempts to connect it with *bakul* (a basket) is obviously invented to explain the name, which has probably no connexion with *timbakau* (tobacco) either. At Patani the flesh of these fish is sometimes eaten raw, being considered a powerful tonic or aphrodisiac, probably on account of their extraordinary vigour in an element so uncongenial to their class. N.A.

SPHYRAENIDAE

20. Sphyraena jello, C. and V.

Sphyraena jello, *Cuv. and Val.*, iii, p. 349.

One specimen from Patani.

'The *Ikan kakachang* (lentil fish) of the Patani fishermen; formerly the object of a family cult[3] at Patani (originally, it is said, on the coast of Kelantan), and still reverenced by certain families at Tanjong Budi.'

PLEURONECTIDAE

21. Cynoglossus macrolepidotus (Blkr.)

Plagusia macrolepidotus, *Blkr.*, *Pleuron*, p. 25.

'This is the *Ikan sa-blab* (half, or split fish) of the Patani Malays, but the name is probably applied to different flat fish in different parts of the Peninsula.'

SILURIDAE

22. Plotosus canius, Ham. Buch.

Plotosus canius, *Ham. Buch.*, *Fish. Ganges*, pp. 142, 347, pl. xv, fig. 44.

One specimen, one-and-a-half inches long.

'Young of the *ikan sembilah*. The spines of this fish—probably several species of Silurids are included in the Malay name—are said to be very poisonous, causing great pain and swelling, and occasionally even death, to human beings scratched by them when wading.'

---

[1] *Antea*, p. 157.
[2] *Fascic. Malay.—Anthropology*, part I, pp. 177, 178.
[3] " " " pp. 74-76.

CLUPEIDAE

23. Opisthopterus tartoor, Russell.

Opisthopterus tartoor, *Russell; Fisb. Vizag.* ii, p. 74, pl. 193.

24. Pellona brachysoma, Blkr.

Pellona brachysoma, *Blkr., Verb. Bat. Gen.* xxiv, *Haring*, p. 82.

SCLERODERMI

25. Triacanthus brevirostris, Temm. and Schleg.

Triacanthus brevirostris, *Temm. and Schleg., Fauna Japon. Poiss.* p. 294 tab. 129, fig. 2.

GYMNODONTES

26. Tetrodon fluviatilis, Ham. Buch.

Tetrodon fluviatilis, *Ham. Bucb., Fish. Ganges*, pp. 6, 362, pl. xxx, fig. 1.

'Common in Patani bay and in the neighbouring rivers. The *ikan buntal* (pillow fish) of the Malays. It is said to be very vicious and to bite people in the water.'

PRISTIDAE

27. Pristis cuspidatus, Latham.

Pristis cuspidatus, *Latbam, Trans. Linn. Soc.*, 1794, ii, p. 279, pl. 26.

Young specimen, Patani bay.

'Young specimens are common enough in this bay and on the seaward shore of Cape Patani.'

RHINOBATIDAE

28. Rhinobatus granulatus (Blkr. Schn.)

Rhinobatus granulatus, *Cuv., Règn. Anim.* p. 353.

'Common in Patani bay.'

SCYLLIDAE

29. Chiloscyllium indicum (Gmel. Linn.)

Squalus indicus, *Gmel. Linn.*, i, p. 1503.

'*Ikan yu bodoh* (stupid shark); said to be so named because it can be captured by a process analogous to "tickling" trout. Young specimens are common in Patani bay.'

CARCHARIDAE

30. Zygaena blochii, Cuv.

Zygaena blochii, *Cuv., Règn. Anim.*

Two specimens, about twelve inches long, from Patani bay.

'The centre of a family cult in Malacca.'

LIST OF FRESHWATER FISHES

By G. A. Boulenger, F.R.S.

'WITH the exception of *Barbus obtusirostris*, the following fishes are from the Patani watershed. One *Barbus* and *Clarias magur* were taken in a jungle stream on Bukit Besar, at an altitude of 2,000 to 2,500 feet; the remainder were caught in the Patani River between Biserat and Patani town.'

CYPRINIDAE

1. **Barbus obtusirostris,** C. and V.
Telôm stream,[1] Perak-Pahang boundary. 4,000 feet.

2. **Barbus douronensis,** C. and V.

3. **Barbus deauratus,** C. and V.

4. **Osteochilus waandersii,** Blkr.

5. **Danglia cuvieri,** C. and V.
Also in Patani bay.

6. **Acanthopsis choerorhynchus,** Blkr.

SILURIDAE

7. **Bagarius yarrellii,** Sykes

8. **Clarias magur,** Ham. Buch.

SYMBRANCHIDAE

9. **Symbranchus bengalensis,** McClell.

NANDIDAE

10. **Catopra fasciata,** Blkr.

OSPHROMENIDAE

11. **Osphromenus olfax,** Comm.

GOBIIDAE

12. **Gobius giuris,** Ham. Buch.

---

[1] This stream is part of the system which ultimately reaches the sea by the Pahang River, so that fish from it may be regarded as belonging to the East Coast Fauna just as much as those from Biserat.—Edd.

ELEPHAS NAMADICUS

By CHARLES W. ANDREWS, D.Sc.

15/12/03

NOTE ON A TOOTH OF ELEPHAS NAMADICUS

By CHARLES W. ANDREWS, D.Sc.

'THE tooth on which Dr. Andrews has been kind enough to write the following note was found by a native on Bukit Besar, Nawngchik, and sold to us at Ban Sai Kau.'

This specimen seems to be of considerable interest on account of the locality in which it was found. It is an upper molar of *Elephas namadicus*, a species found in the Upper Siwalik beds, particularly in the Nabada valley. I have also received remains of this animal from Burma (near Mandalay) quite lately, but never from further south. Of course the Siwalik fauna is known to occur in Sumatra and Java, though I do not think that this particular species has been recorded from these islands. In any case, the occurrence of this tooth in the Peninsula helps to bridge over one of the gaps in the area over which the Siwalik fauna extended.

The age of *E. namadicus* was probably late Pliocene or early Pleistocene.

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APPENDIX

DIAGNOSES OF ACULEATE HYMENOPTERA

By LIEUT.-COLONEL C. T. BINGHAM

'AS it is impossible to include in the present volume the full report on the Aculeate Hymenoptera, in which one hundred and seventy-four species are recorded, it has seemed best to publish Colonel Bingham's new diagnoses in an appendix, postponing the bulk of his paper until a third zoological part of *Fasciculi Malayenses* can appear.'

FOSSORES

MUTILLIDAE

Genus **Mutilla,** Linn.

Mutilla oculata, Fabr.

Mutilla oculata, *Fabr.*, *Syst. Piez.*, 1804, p. 452 ♀.

A pair taken in *in cop.* The male, so far as I know, has not been described.

♂. Head, thorax, and legs black, abdomen bright red, the basal four-fifths of the first and the whole of the apical segment black, wings hyaline for a third of their length from base and beyond that fuscous with in certain lights a purple sheen, the face in front, the scape of the antennae at base, the pronotum, a fringe round the scutellum posteriorly, the median segment above, and the legs covered with glistening, silvery pubescence, abdomen at base and at apex with black, on the intermediate segments with more sparse, rich golden pubescence. Head densely coarsely punctured, seen from the front broad, almost as broad as long, the vertex gently arched, the ocelli on a raised plane, the eyes emarginate on the inner side towards the top; below them the face is slightly constricted, mandibles arcuate, clypeus with a strong, broad, short medial longitudinal carina, antennae somewhat thick, the scape deeply grooved in front. Thorax densely punctured, short, broader than the head, the mesonotum with two medial and two lateral longitudinally impressed lines, scutellum conical, projecting, median segment closely punctured, broad, obliquely truncate posteriorly, above with two lateral outwardly arched and two medial V-shaped carinae running from base to apex of truncation; legs comparatively long, wings ample, the fore wing with three cubital cells, the nervures black, the tegulae large, smooth, polished, and shining. Abdomen shining, the base and apical segments closely punctured, the remaining segments smooth, with a zone of punctures beyond their middle; basal segment constricted, somewhat campanulate, with a well-marked carina beneath, this last widely but slightly emarginate in the middle; pygidium convex, bearing in the middle a slightly raised oval tubercle, which is smooth and shining.

Length, ♂, 16 to 17 mm.; *Exp.*, 30 mm.

SCOLIIDAE

Genus **Scolia,** Fabr. ; Subgenus **Discolia** (with two cubital cells in forewing).

Scolia robinsoni, sp. nov.

♀. Black, highly polished and shining, but without a trace of purple or green reflections on the head, thorax, or abdomen ; wings, dark fuscous with a brilliant purple reflection along the costal margin of the forewing, turning to brilliant metallic green on the inferior half of the fore, and on the whole of the hind wing ; the sides of the clypeus, the base of the antennae, the back of the head, the pronotum and mesonotum anteriorly, the sides of the thorax, the legs, and the abdomen, clad with stiff long black hairs, dense behind the head, on the pronotum, the legs, and the apical segments of the abdomen. Head narrower than the thorax, densely punctured between and around the bases of the antennae, remarkably smooth and unpunctured on the vertex, which is sharply sloped anteriorly ; clypeus large, convex, its anterior margin entire ; eyes remarkably small, elongate, deeply indented on the inner margins. Thorax massive, elongate, the pronotum anteriorly and on the sides, coarsely punctured ; the disc of the mesonotum, the scutellum, postscutellum, and median segment, smooth, unpunctured ; the scutellum, postscutellum, and median segment with a gentle slope posteriorly, the last broad, its posterior angles rounded ; legs long, robust, the anterior tibial calcaria flattened, castaneous. Abdomen, long and narrow, sparsely punctured, the punctures on the apical two or three segments smaller and closer, the basal segment constricted at apex, the second segment not tuberculated above.

Length, ♀, 24 mm. ; *Exp.*, 46 mm.

Habitat. Bukit Besar, Nawngchik. 2,500 feet.

Genus **Pseudagenia,** Kohl.

Pseudagenia marpesia, sp. nov.

♀. Head and thorax, the tarsi of the anterior, the apex of the femora, the tibiae and tarsi of the intermediate and posterior legs, and the abdomen, black ; the coxae, trochanters, femora and tibiae of the anterior legs, the coxae, trochanters, and greater portion of the femora of the intermediate and posterior pair of legs, blood red ; the wings yellowish hyaline, a dark fuscous crescent-shaped cloud along the basal nervure, and a larger subapical cloud from the costal margin of the radial cell to the posterior margin of the wing ; tegulae black, nervures testaceous. Head transverse, slightly broader than the thorax, clypeus twice as broad as long, boldly arched anteriorly, face slightly concave, eyes convergent above ; thorax : the prothorax more or less cubical, the anterior angles rounded, the sides with a wide shallow groove, the posterior margin very widely arched, mesonotum flat, scutellum and postscutellum horizontal, median segment long, with a gradual slope posteriorly ; legs stout, short, the tibiae of the intermediate and posterior pair with minute spines ; abdomen fusiform, as long as the thorax. Head and thorax opaque, minutely and closely punctured, and covered with sparse very fine short silky pubescence, the sides of the postscutellum and metapleura finely, obliquely striate, the median segment somewhat more coarsely punctured than the rest of the thorax, and in the middle minutely reticulate ; abdomen, smooth and shining.

Length, ♀, 13 mm. ; *Exp.*, 22 mm.

Habitat. Bukit Besar, Nawngchik.

Genus **Ceropales,** Latr.

Ceropales ligea, sp. nov.

♀. Black, the clypeus, a spot in the emargination of the eyes, a narrow line behind them, the anterior angles of the prothorax, a line on its posterior margin, the postscutellum, the posterior lateral lower angles of the median segment, a spot on the front of all the coxae, the apex of the femora of the anterior legs behind, the apex of the femora of the intermediate legs in front, a line broadly interrupted in the middle on abdominal segments one to four and the whole of the sixth segment above ivory white, the tibiae and basal joint of the tarsi of the anterior legs testaceous red with a line of black above, the femora except at the extreme apex of the posterior pair of legs blood red, the calcaria of all the legs except the inner one on the posterior legs ivory white ; wings clear hyaline, slightly fuscous towards their apical margins. Head, thorax, and abdomen shining with a silky lustre, very minutely rugulose. Antennae dull black, setaceous, the scape and basal joint of the flagellum in front ivory white.

Length, ♀, 6 mm. ; *Exp.,* 12 mm. ; *Exserted sting,* 1·5 mm.

Habitat. Sungkei, South Perak.

In a collection of Burmese Hymenoptera, which I have not yet worked out, there are two females of this species.

SPHEGIDAE

Genus **Cerceris,** Latr.

Cerceris annandali, sp. nov.

♂. Head, thorax, and abdomen black, a spot at the base of the mandibles, the clypeus, a triangular spot above it, the sides of the face, a short line on the scape in front, a small spot behind the eyes, a line broadly interrupted in the middle on the posterior margin of the pronotum, the postscutellum, a spot on the anterior upper angles of the median segment, a larger triangular spot on each side of the apex of the same, the femora and tibiae in front and the basal joint of the tarsi of the anterior and intermediate legs, the coxae above, a line on the femora and tibiae in front, and the basal joint of the tarsi of the posterior legs, a fine line broadening laterally along the margin of the third abdominal segment above, a triangular spot on each side of the second ventral segment and a quadrate spot on each side of the third ventral segment bright lemon yellow ; wings hyaline, shaded with dark fuscous along the costal margins of the forewing. Head, thorax, median segment, and first abdominal segment somewhat coarsely punctured, but shining not opaque, rest of the abdomen smooth, shining and highly polished. The punctures are partly effaced on the clypeus and face in front. Head broad, broader than thorax, inner orbits of the eyes nearly parallel, a sharp short vertical carina between the antennae ; the first abdominal segment long, cylindrical, attenuated to form a pedicel, the pygidial area flat, minutely punctured.

Length, ♂, 12 mm. ; *Exp.,* 22 mm.

Habitat. Biserat, Jalor.

ANTHOPHILA

APIDAE

Genus **Halictus,** Latr.

Halictus validus, sp. nov.

♀. Black, the apex of the antennae and the femora, tibiae and tarsi of the legs rufo-piceous, the latter with bright yellowish-brown pubescence, the face in front and the sides of the thorax with whitish hoary pubescence, the abdomen covered sparsely with jet black rather stiff hairs. Head

FASCICULI MALAYENSES

FASCICULI MALAYENSES

ANTHROPOLOGICAL AND ZOOLOGICAL RESULTS OF AN EXPEDITION
TO PERAK AND THE SIAMESE MALAY STATES, 1901-1902

UNDERTAKEN BY
NELSON ANNANDALE AND HERBERT C. ROBINSON
UNDER THE AUSPICES OF THE UNIVERSITY OF EDINBURGH AND
THE UNIVERSITY OF LIVERPOOL

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PART III

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REPORT ON THE BUTTERFLIES OF THE FAMILY LYCAENIDAE

BY

HAMILTON H. DRUCE, F.Z.S., F.E.S.

INTRODUCTORY NOTE

WE paid less attention to the *Lycaenidae* than to other butterflies, and our collection is a small one as regards this family: roughly speaking, there are only about twice as many individuals as species represented. In the Malay Peninsula the 'Blues' have much the same habits as in other tropical countries. Most of them delight in extremes of light and shade, are attracted to putrid animal and vegetable substances, and frequent the edges of streams and other places where they can suck up moisture. Other observers have noted that while they rest the wings are often given a rotary movement, which agitates the 'tails,' so common at the posterior extremity of the wings in this family, in a very lively manner, giving them the appearance of antennae, while the spots generally present at their base represent eyes. It is obvious, from the mutilations noted on the wings that birds are attracted to the false head thus simulated, and that the insects often escape capture and destruction with the loss of a part of the wings which is of very little, if any, direct importance to them. This is certainly true of a large number of species in Malaya; but there are several common species (especially *Loxura atymnus*, a copper-coloured form, in which the 'tails' are very stout) which rest with their wings slightly separated from one another and absolutely still. A comparison between the state of the wings in worn specimens in such a form and in another equally common in which the wings are rotated would be interesting; but our limited collection does not provide sufficient material for such a comparison. Something more may be said with regard to the 'tails' of butterflies, especially in the genus *Cyrestes*, in Mr. ROBINSON's Report on the remainder of our butterflies, the publication of which, it is hoped, may not be long delayed.

NELSON ANNANDALE

REPORT ON THE BUTTERFLIES OF THE FAMILY LYCAENIDAE

By HAMILTON H. DRUCE, F.Z.S., F.E.S.

1. Gerydus biggsii

Gerydus biggsii, *Dist. Rhop. Malay.*, p. 206, pl. 22, fig. 12.

1. Mabek, Jalor. 7th July, 1901.

'Flying in open space, surrounded by thick jungle, at the top of small hill.'

2. Gerydus, sp. (?)

♂, ♀ of an apparently undescribed species allied to *G. symethus*, Cr. and *G. improbus*, H. H. Druce.

♂, ♀ (*in cop.*) Jeram Kawan, Batang Padang, South Perak. 14th February, 1902.

3. Paragerydus horsfieldi

Miletus horsfieldi, *Moore*, *Cat. Lep. Mus. E.I.C.*, vol. i, p. 19, pl. 1a, fig. 2.

1. Mabek, Jalor. 23rd July, 1901.

4. Megisba malaya

Lycaena malaya, *Horsf. Cat. Lep. E.I.C.*, p. 70.

1. Label missing.

5. Cyaniris melaena

Cyaniris melaena, *Doherty*, *J.A.S.B.*, vol. lviii, p. 434, pl. 23, fig. 13 (1889).

One ♂ agreeing with Distant's figure of *C. jynteana* de Nicév. as regards the width of the black borders.

1. Bukit Besar, Nawngchik. 2,500 feet. 6th May, 1901.

'On stones in stream.'

6. Cyaniris albocaeruleus

Polyommatus albocaeruleus, *Moore, P.Z.S.*, 1879, p. 139.

1. No label. Probably Bukit Besar.

7. Cyaniris musina (?)

Cyaniris musina, *Snell. Tijd. voor, Ent.* vol. xxxv., p. 145, 1892.

I identify this with some doubt; it is not much like De Nicéville's figure.

1. Label missing. Probably Bukit Besar.

8. Cyaniris selma, H. H. Druce.

Cyaniris selma, *H. H. Druce, P.Z.S.*, 1895, p. 573, pl. 32, fig. 10, ♂.

One ♂ agreeing exactly with type of *C. selma* on underside, but darker blue above.

1. Label missing. Probably Bukit Besar.

9. Cyaniris lambi

Cyaniris lambi, *Distant, Anns. Mag. Nat. Hist.*, ser. v, vol. x, p. 245 (1882).

Three specimens, ♂, ♂, which I identify without doubt as this species, which is very distinct. Distant's figure is not at all good, and makes it look much more like *C. puspa* Horsf. than *C. lavendularis* Moore, to which as Distant states (*Rhop. Exot.* p. 211) it is nearly allied. Dr. Butler, in his recent 'List of the species ot Cyaniris,' *Anns. Mag. Nat. Hist.*, ser. 7, vol. 5, does not mention *C. lambi.*

3. Bukit Besar, Nawngchik. 2,500 feet. 30th April, 1st and 8th May, 1901.

'Flying about stream and path in morning, at mid-day, and in afternoon, often resting on stones. Flight very slow.'

10. Cyaniris splendens

C. splendens, *Butler, Anns. Mag. Nat. Hist.*, ser. 7, vol. 5, p. 444 (1900).

One ♂ much damaged.

Telôm, Perak-Pahang boundary. 4,000 feet. 22nd January, 1902.

11. Cyaniris sp. (?)

Several specimens much rubbed.

Allied to *C. placida* de Nicév. and *C. jynteana* de Nicév.

5. Telôm, Perak-Pahang boundary. 4,000 feet. 17th and 20th January, 1902.

'At edge of jungle stream, on stones in stream, and in thick jungle.'

12. Zizera karsandra

Polyommatus karsandra, *Moore*, *P.Z.S.*, 1865, p. 505, pl. 31, fig. 7.

1. Biserat, Jalor. 4th July, 1901.

'Flying over scanty vegetation on sand during rain at sunset.'

13. Zizera otis

Papilio otis, *Fab. Mant. Ins.*, vol. ii, p. 73 (1787).

1. Biserat, Jalor. 14th July, 1901.

'Flying over scanty grass at dusk.'

14. Una usta

Zizera (?) usta, *Dist. Anns. Mag. Nat. Hist.*, ser. 5, vol. xvii, p. 531 (1886).

2. Telôm Perak-Pahang boundary. 4,000 feet. January, 1902.

'At edge of stream.'

15. Nacaduba noreia

Lycaena noreia, *Feld. Verh. zool.-bot. Gesell. Wien.* vol. xviii, p. 282 (1868).

1. Bukit Besar, Nawngchik. 500-800 feet. 19th April, 1902.

16. Nacaduba atratus

Lycaena atratus, *Horsf. Cat. Lep. E.I.C.*, p. 78 (1828).

1. Bukit Besar, Nawngchik. 2,500 feet.

'Edge of stream; morning.'

17. Nacaduba bhutea

N. bhutea *de Nicév. J.A.S.B.*, vol. lii, p. 72, pl. 1, fig. 13 (1883).

One specimen which differs only from Sikkim specimens by the total absence of the tails. It may prove to be a distinct species.

1. Bukit Besar, Nawngchik. 2,500 feet. 6th May, 1901.

'On stones in stream.'

18. Nacaduba ardates

Lycaena ardates, *Moore*, *P.Z.S.*, 1874, p. 574, pl. 67, fig. 1.

1. Perak boundary, Rhaman. 18th April, 1902.

19. Jamides bochus

Papilio bochus, *Cr. Pap. Exot.*, v. iv, p. 210, pl. 391, figs. C, D (1782).

1. Biserat, Jalor. 8th July, 1901.

'Flying among bushes; midday.'

2 ♀. Patani town. 9th September, 1901.

20. Lampides elpis

Polyommatus elpis *Godt. Enc. Méth.* vol. ix, p. 654 (1823).

1. Bukit Besar, Nawngchik, 29th August, 1901.

21. Lampides subdita

L. subdita, *Moore, Journ. Linn. Soc. Zoology*, vol. xxi, p. 41 (1886).

7. Biserat, Jalor. July, 1901.

'Common on jungle road, Biserat, in July.'

1. Bukit Besar, Nawngchik. 2,000 feet. 7th September, 1901.
1. Jarum, Hulu Rhaman. 22nd April, 1902.

22. Lampides celeno

Papilo celeno, *Cr. Pap.*, Ex. I, t. 31, figs. C, D (1775).

1. Biserat Jalor. 12th July, 1901.

'In long grass.'

1. Ban Sai Kau, Nawngchik. September, 1901.

'Secondary jungle; afternoon.'

1. Bukit Besar, Nawngchik. 500-800 feet. 19th May, 1901.
1. Jarum, Hulu Rhaman. 22nd April, 1902.

23. Catochryseps strabo

Hesperia strabo, *Fab. Ent. Syst.*, vol. iii, p. 287 (1793).

1. Perak Boundary, Rhaman. 18th April, 1902.

24. Catochrysops platissa

Lycaena platissa, *Herr-Schf.*, *Stett. Ent. Zeit.*, vol. xxx, p. 74, pl. IV, fig. 20.

3. Biserat, Jalor. 12th July, 1901.

'Among long grass at midday.'

25. Castalius rosimon

Papilio rosimon, *Fab. Syst. Ent.*, p. 523 (1775).

4. Biserat, Jalor. June, July, August, 1901.

'On jungle paths.'

1. Bukit Besar, Nawngchik. 19th May, 1901.

'Clearing at base of hill.'

1. Perak boundary, Rhaman. 5th April, 1902.

26. Castalius ethion

Lycaena ethion, *Doub. and Hew. Gen. Diur. Lep.*, vol. ii, p. 490, pl. 76, fig. 3 (1852).

1. Biserat, Jalor. 14th July, 1901.
1. Mabek, Jalor. 27th July, 1901.

27. Castalius roxus

Polyommatus roxus, *Godt. Enc. Méth.*, vol. ix, p. 659 (1823).

4. Biserat, Jalor. 11th to 16th July, 1901.

'In morning, at mid-day, and in afternoon. In jungle, and on wet sand and newly dug earth.'

1. Mabek Jalor. 23rd July, 1901.
1. Telôm, Perak-Pahang boundary. 3,500 feet. January, 1902.

28. Polyommatus boeticus

Papilio boeticus, *Linn. Syst. Nat.* ed. xii, vol. i, p. 789 (1767).

♂, ♀ (*in. cop.*). Jambu, Jhering. 5th June, 1901.

29. Amblypodia anita

Amblypodia anita, *Hew. Cat. Lyc. B.M.*, p. 14, pl. 8, figs. 90-91 (1862).

1. Biserat, Jalor. 21st October, 1901.

'Flying in jungle at mid-day.'

1. Cape Patani, Jhering. 10th June, 1901.

'Flying at mid-day among undergrowth in casuarina wood by sea.'

30. Arhopala centaurus

Papilio centaurus, *Fab. Syst. Ent.*, p. 520 (1775).

1. Mabek, Jalor. 27th July, 1901.

'In jungle; afternoon.'

1. Ban Sai Kau, Nawngchik. 21st May, 1901.

'Wings much injured when taken. On wing at mid-day. Sluggish.'

Bukit Besar. About 400 feet above Sai Kau.

'In large numbers on flowers of *Melastoma*. Dull morning.'

31. Arhopala perimuta

Amblypodia perimuta, *Moore, Horsf. and Moore Cat. Lep. E.I.C.*, vol. i, p. 42 (1857).

1. Biserat, Jalor. 14th July, 1901.

'On jungle path; late afternoon.'

32. Apporasa atkinsoni

Amblypodia atkinsoni, *Hew. Ill. Diur. Lep.*, p. 149, pl. 3b, figs. 48 and 49 (1869).

1. Mabek, Jalor. 24th July, 1901.

'Resting on bush in open at dusk.

33. Mahathala ameria

Amblypodia ameria, *Hew. Cat. Lyc. B.M.*, p. 14, pl. 8, figs. 85 and 86 (1862).

1. Mabek, Jalor. 23rd July, 1901.

'Flying among undergrowth of jungle at mid-day.'

34. Ouretis malayica

Anops malayica, *Feld. Reise Novara, Lep.*, vol. ii, p. 221, pl. 28, fig. 18 (1865).

1. Ban Sai Kau, Nawngchik. 16th September, 1901.

'In bed of stream, sitting on granite rock with wings closed; harmonizing exactly with colour of stone, and almost impossible to see.' H. C. R.

35. Ilerda epicles

Polyommatus epicles, *Godt. Enc. Méth.*, vol. 9, p. 646 (1823).

3. Telôm, Perak-Pahang boundary. 4,000 feet. 22nd, 23rd January, 1902.

36. Spindasis syama

Amblypodia syama, *Horsf. Cat. Lep. E.I.C.*, p. 107 (1829).

2. Biserat, Jalor. 12th July and 18th October, 1901.

'Flying among long grass on river bank at mid-day, and on flowers of shrub with many other insects of different orders.'

37. Suasa suessa

Suasa suessa, de Nicév, *J.B.N.H. Soc.*, vol. vii, pl. H, figs. 8, 9 (1892).

1. Bukit Besar, Nawngchik. *Circa* 1,500 feet. 7th September, 1901.

38. Hypolycaena erylus

Polyommatus erylus, *Godt, Enc. Méth.*, vol. ix, p. 633.

1. Bukit Besar, Nawngchik. Base of hill. 19th May, 1823.
1. Cape Patani. 30th September, 1901.

'Flight very rapid.'

39. Zeltus etolus

Papilio etolus, *Fab. Mant. Ins.* vol. ii, p. 66 (1787).

2. Biserat, Jalor. 29th June and 14th July, 1901.

'On jungle path, late afternoon, and on open sunny road overgrown with low shrubs.'

1. Bukit Besar, Nawngchik. 2,500 feet. 18th June, 1901.

'Flying in clearing after rain, afternoon.'

40. Cheritra freja

Hesperia freja, *Fab. Ent. Syst.* vol. iii, p. 263 (1793).

1. Biserat, Jalor. 25th October, 1901.

41. Biduanda thesmia

Myrina thesmia, *Hew. Ill. Diur. Lep.* p. 32, pl. 4, figs. 25, 27 (1863).

1. Biserat, Jalor. 3rd July, 1901.
1. Bukit Besar, Nawngchik. 2,500 feet. (?)
1. Bukit Besar, Nawngchik. 500-800 feet. 19th May, 1901.

'At edge of jungle ; afternoon.'

42. Marmessus moorei

Sithon moorei, *Dist. Anns. Mag. Nat. Hist.* ser. 5, vol. x, p. 246 (1882).

4. Biserat, Jalor. 3rd and 14th July, 1601.

'Flies low ; secondary jungle ; afternoon.'

1. Mabek, Jalor. 25th July, 1901.

'Flying at edge of jungle ; midday.'

1. Bukit, Besar, Nawngchik. 2,500 feet. 3rd September, 1901.

43. Loxura atymnus

Papilio atymnus, *Cr. Pap. Ex.* vol. 4, pl. 331, figs. D, E (1780).

5. Biserat, Jalor. 29th June to 12th July, 1901.
3. Mabek, Jalor. 25th and 27th July, 1901.

'This species does not give its wings a rotatory movement, as many of the tailed Lycaenidae do when at rest, but sits with them partially expanded and quite motionless. It is common in the Patani States.'

44. Yasoda pita

Loxura pita, *Horsf. Cat. Lep. E.I.C.*, p. 122 (1829).

1. Bukit Besar, Nawngchik. 2,500 feet. 30th August, 1901.

45. Sithon nedymond

Papilio nedymond, *Cr. Pap. Exot.* vol. iv, p. 19, pl. 299, figs. E, F (1780).

1. Mabek, Jalor. 25th July, 1901.

'Flying in jungle at mid-day.'

46. Deudorix epijarbas

Dipsas epijarbas, *Moore*, *Horsf. and Moore*, *Cat. Lep. Mus. E.I.C.*, p. 32 (1857).

1. Biserat, Jalor. 18th October, 1901.
1. Bukit Besar, Nawngchik. 2,500 feet. 7th May, 1901.

'During life the real eye of this species is, like the "eye" at the base of the tail, black surrounded by a white ring.'

47. Rapala varuna

Thecla varuna, *Horsf. Cat. Lep. E.I.C.*, p. 91 (1829).

1. Biserat, Jalor. 8th July, 1901.

'Flying in jungle at mid-day.'

48. Rapala barthema

Deudorix barthema, *Dist. Rhop. Malay*, p. 280 (1885).

1. Biserat, Jalor. 14th July, 1901.

'Jungle path ; morning.'

49. Rapala utimutis

·Deudorix utimutis, *Dist. Rhop. Malay*, p. 279, pl. 23, fig. 22 (1885).

1. Biserat, Jalor. 18th October, 1901.

50. Rapala jarbas

Papilio jarbas, *Fab*, *Mant. Ins.*, vol. ii, p. 68 (1787).

1. Jeram Kawan, South Perak. 12th February, 1902.

'Resting on leaf, with wings partially expanded and still.'

51. Bindahara phocides

Hesperia phocides, *Fab. Ent. Syst.*, vol. iii, p. 282 (1793).

1. Biserat, Jalor. 7th July, 1901.

ACULEATE HYMENOPTERA

BY

LIEUT.-COLONEL C. T. BINGHAM

C 3/5/05

INTRODUCTORY NOTE

THERE is little to be said, from a bionomic point of view, on the collection of *Hymenoptera*, which Colonel BINGHAM[1] has been good enough to report upon, except as regards the number of ants closely resembled by other insects and spiders and the habits of *Oecophylla smaragdina*. The species were collected quite indiscriminately, but it is probable that the ants are proportionately better represented than the other divisions of the *Aculeata*.

As regards distribution, more extensive collections will possibly show that there is a marked difference between the Hymenopterous fauna of the East and West Coasts of the Peninsula—a difference which finds its parallel in the case of other groups.

It may be noted, for instance, that *Xylocopa oestuans*, almost the commonest bee in the Patani States, is decidedly a rare insect in Perak and Selangor; whereas the larger species of *Scolia* and *Salius*, such as *Scolia procer* and *Salius ducalis*, two of the most characteristic forest insects on the West Coast, are of very sporadic occurrence in Patani. The differences are probably correlated with rainfall, for in the latitude of Patani there are distinct wet and dry seasons, while in Perak and the other Western States to the south of it the wettest month of one year is not infrequently the dryest of the next.

HERBERT C. ROBINSON

SELANGOR STATE MUSEUM
KUALA LUMPUR
FEDERATED MALAY STATES
June 2, 1904

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[1] The editors of *Fasciculi Malayenses* must express their special indebtedness to Colonel Bingham, who, in their absence in different parts of the East, has kindly made arrangements regarding the plate and proofs. As some confusion appears to have arisen on the point we may perhaps point out that the editors, not the author, of the various reports in *Fasciculi Malayenses* are responsible for all statements enclosed between single inverted commas.—*Edd.*

REPORT ON THE ACULEATE HYMENOPTERA

By Lieut.-Colonel C. T. BINGHAM

Of the one hundred and seventy-four forms of Aculeate Hymenoptera collected by the Expedition, eight proved to be previously undescribed. Full diagnoses of these eight were published in the Appendix to Part II of this work. Of the rest, nineteen forms only have not so far been reported as occurring within the limits of British India, as defined in the volume on Mammals in the Fauna of India series. That this should be so is not surprising, as the collection was made in a country of which the configuration and climate is very like that of Tenasserim. Again, the commoner forms which are naturally the first to be procured have often a very wide range, and although, in certain cases, these may be modified into local races ; such races in the Hymenoptera seem to be rarely constant. Another factor which has to be taken into consideration is that in certain widely distributed forms similar variations seem frequently to occur throughout the limits of their range.

No detailed analysis of the collection is attempted as our knowledge of the Hymenopterous fauna of Siam and of Pahang, and the rest of the Malay Peninsula to the south, is still very imperfect.

TUBULIFERA

CHRYSIDIDAE

STILBUM

1. Stilbum cyanurum, var. splendidum

Chrysis splendida, *Fabr. Syst. Ent.*, 1775, p. 357.
Stilbum cyanurum, *var.* splendidum, *Dalla Torre. Cat. Hym.* vi, 1892, p. 40.

Biserat, Jalor. October.

Spread over both hemispheres.

'Apparently parasitic on several Hymenopterous species, which dug galleries in the house-posts.'

CHRYSIS, Linn.

Hexachrysis, Lichtens

2. Chrysis (Hexachrysis) principalis

Chrysis principalis, *Smith*, *Trans. Ent. Soc.*, 1874, p. 461.

Biserat, Jalor.

Found also in India. Recorded from the Himalayas, Bengal, Bombay, Ceylon, Burma, Tenasserim, and China.

HETEROGYNA

FORMICIDAE

Dorylinae

AENICTUS

3. Aenictus clavatus

Aenictus clavatus, *Forel*, *Journ. Bomb. N. H. Soc.* xiii (1901), pp. 467 and 471, ♂.

♂'s. Biserat, Jalor. October.

Very dark in colour and somewhat more slender than typical specimens. Described originally from South-Western India. Occurs in Sikhim and Burma.

Ponerinae

MYOPOPONE, Roger

4. Myopopone castanea

Amblyopone castanea, *Smith*, *Journ. Linn. Soc.* v (1860), p. 105, pl. i; fig. 6, ☿; *Roger*, *Berl. Ent. Zeit.* v (1861), pp. 50-52, ☿, ♀, ♂.

♀. Telôm, Perak-Pahang boundary. 4,000 feet. January, 1902.

'Flying, at mid-day.'

Found throughout the Indo-Malayan region.

ODONTOMACHUS, Latr.

5. Odontomachus haematoda

Formica haematoda, *Linn. Syst. Nat.* Ed. 10, i, 1758, p. 582, ☿.

Biserat, Jalor. October.

'Nest under fallen tree.'

Found throughout the greater part of the Indo-Malayan region. Has a wide distribution, extending to Africa, and even to America.

6. Odontomachus rixosus

Odontomachus rixosus, *Smith, Journ. Linn. Soc.* ii (1857), p. 64, ☿.

Kampong, Jalor. November.
Bukit Besar, Nawngchik. 2,500 feet. October.

Found also in Assam, Burma, Sumatra, and Java.

LOBOPELTA, Mayr.

7. Lobopelta distinguenda

Lobopelta distinguenda, *Emery, Ann. Mus. Civ. Gen.* xxv (1887), p. 430, pl. i, fig. 4.

Bukit Besar, Nawngchik. 2,500 feet. May.

'Malay name "*Semut api.*"'[1] I believe the red tree ant (*Oecophylla smaragdina*) is also called 'Semut api,' or 'fire-ant' by the Malays.

ODONTOPONERA, Mayr.

8. Odontoponera transversa

Ponera transversa, *Smith, Journ. Linn. Soc.* ii (1857), p. 68, ☿.
Odontoponera transversa, *Forel, Journ. Bomb. N. H. Soc.* xiii (1900), p. 314, ☿.

Mabek, Jalor. July.
Bukit Besar, Nawngchik. August.

'Taken off inflorescence of tree in jungle.'

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[1] The native names are often very local, and are used somewhat indiscriminately.—*Edd.*

DIACAMMA, Mayr.

9. Diacamma rugosum

Ponera rugosa, *Le Guillon*, *Ann. Soc. Ent. Fr.* x (1840), p. 318.
Ponera versicolor, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 26.
Diacamma rugosum, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xii (1862), p. 718.

Gedong, South Perak. January.

10. Diacamma vagans

Ponera vagans, *Smith*, *Journ. Linn. Soc.* iv (1860), p. 103, ☿.
Diacamma vagans, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xii (1862), p. 718.

Biserat, Jalor.

'Running on sand below bushes on which ant-like Attidae were found.'

Gedong, South Perak. January.

Spread through the Indo-Malayan and Austro-Malayan regions.

ECTOMOMYRMEX, Mayr.

11. Ectomomyrmex astutus

Pachychondyla astuta, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 107, ☿.
Ectomomyrmex sundaicus, *Mayr.*, *Tijds. v. Ent.* x (1867), p. 85, ☿.
Ectomomyrmex astutus, *Bingh.*, *Faun. Brit. Ind.* ii, 1903, p. 86, fig. 45, ☿.

Bukit, Jalor. October 31, 1901.

Spread through the Indo-Malayan region and extending to Australia.

CRYPTOPONE, Emery

12. Cryptopone testacea

Amblyopone testacea, *Motsch.*, *Bull. Soc. Nat. Mus.* xxxvi, 2 (1863), p. 15, ♀.
Cryptopone testacea, *Emery*, *Ann. Soc. Ent. Fr.*, 1893, p. 240, ☿.

2 ♀'s. Biserat, Jalor. October.

This species, though much smaller, superficially resembles *Pseudoponera amblyops*, EMERY, and *P. darwini*, FOREL. These latter, however, have the hind tibiae furnished with two calcaria, whereas *Cryptopone testacea* has but one. *C. testacea* was originally described from Ceylon.

MYRMICINAE

SIMA, Roger

13. Sima rufonigra

Eciton rufonigra, *Jerdon*, *Madr. Journ. Lit. Sci.* xvii (1851), p. 111.
Sima rufonigra, *Forel*, *Journ. Bomb. N. H. Soc.* xiv (1903), pp. 708, 709, ☿.

Patani town.
Biserat, Jalor.
Ban Sai Kau, Nawngchik.
Gedong, South Perak.

'A very common species throughout the Malay Peninsula, preferring sandy localities. It was particularly abundant about the houses in Patani at al seasons, but was more common at Biserat in September and October than in June and July. At this place we took several specimens of an Attid spider which resembles it with wonderful detail, but we are not yet able to say whether the spider is the same that mimics the species in India, and we never took it actually together with the ant. The Malay name of the ant in the Patani States is "*semut sabong*," and the term is more fixed than most which the Malays apply to insects. On several occasions we showed the mimicking spider to natives, who always called it by this name.'

Common throughout nearly the whole of India, Assam, Burma, Tenasserim, and Ceylon. The virulence of the sting is noted by Messrs. ANNANDALE and ROBINSON, but they do not regard it as quite so virulent as that of *Lobopelta distinguenda*.

14. Sima nigra

Eciton nigra, *Jerdon*, *Madr. Journ. Lit. and Sci.* xvii (1851), p. 112, ☿; *id. A. M. N. H.* (2) xiii (1854), p. 53, ☿.
Tetraponera atrata, *Smith*, *A. M. N. H.* (2), ix (1852), p. 44.
Pseudomyrma carbonaria, *Smith*, *Journ. Linn. Soc.* vii (1863), p. 20, ♀, ☿.
Sima nigra, *Forel*, *Journ. Bomb. N. H. Soc.* xiv (1903), p. 709, ☿.

Biserat, Jalor.
Senggora town. December.

Recorded also from Continental India, Ceylon, Burma, and Tenasserim.

MYRMICARIA, Saunders

15. Myrmicaria brunnea

Myrmicaria brunnea, *Saunders*, *Trans. Ent. Soc.* iii (1841), p. 57, pl. v, fig. 2, ♂.

Myrmicaria carinata, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 73, ☿.
Heptacondylus subcarinatus, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 73, ☿.

Telôm, Perak-Pahang boundary. 4,000 feet. January.
Makek, Jalor. July.

'Taken at Mabek on leaves of shrub, on which an Attid spider closely resembling them was also obtained at the same time.'

CATAULACUS, Smith

16. Cataulacus hispidus

Cataulacus hispidus, *Smith*, *Trans. Ent. Soc.*, 1876, p. 611, pl. ii, fig. 11, ☿.

Biserat, Jalor. October.

'Nesting in the upper part of small termite's nest on a small tree in secondary jungle. A millipede and a scorpion were collected in the same nest.' H.C.R.

Smith's type is from Singapore.

17. Cataulacus latus

Cataulacus latus, *Forel*, *Grandidier Hist. Phys. Nat. Pol. Madagasc.* xx, pt. II (1892), p. 144; *Wroughton*, *Journ. Bomb. N. H. Soc.* vii (1892), p. 178, pl. c, figs. 8-10.

Mabek, Jalor. July.

Found also in India (Bengal), Burma, and Tenasserim.

CREMASTOGASTER, Lund.

18. Cremastogaster dohrni

Cremastogaster dohrni, *Mayr.*, *Verb. Zool. Bot. Ges. Wein.* xxviii (1878), pp. 681 and 682, ☿.

Biserat, Jalor.

'From among low shrubs accompanied by a small larval Hemipteron (*Pyrrhochordae* ?), which bore a very close resemblance to them.'

Recorded also from Ceylon, Burma, and Tenasserim.

19. Cremastogaster mogdiliani

Cremastogaster mogdiliani, *Emery*, *Ann. Mus. Civ. Gen.* xl (1900), p. 696, ☿.

Bukit Besar, Nawngchik. 2,500 feet. May.

'Running about with small Carabid beetles, which closely resembled it in form and gait, on the broad leaves of Zingiberaceous plants.'

Described originally from Tenasserim.

20. Cremastogaster rothneyi

Cremastogaster rothneyi, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xxviii (1878), pp. 681-685, ☿.

Bidor, South Perak. February.

Recorded also from Continental India.

21. Cremastogaster difformis

Cremastogaster difformis, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 76, ☿.

Mabek, Jalor. July.

'On tree-trunks in rice field.'

Recorded also from Southern Tenasserim, Borneo, Sumatra, and Java.

PHIDOLOGITON, Mayr.

22. Phidologiton affinis

Oecodoma affinis, *Jerdon*, *Madr. Journ. Lit. and Sci.* xvii (1851), p. 110, ☿.
Atta bellicosa, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 164, ☿.
Solenopsis laboriosa, *Smith*, *Journ. Linn. Soc.* vi (1861), p. 48, ☿.
Phidologiton affinis, *Roger*, *Verz. d. Formicid*, 1863, p. 30.

Biserat, Jalor.

'They made runs on the ground leading in various directions from the nest and depressed beneath the general level. The nests themselves were buried at a depth of some inches.'

Indo-Malayan region.

MERANOPLUS, Smith

23. Meranoplus mucronatus

Meranoplus mucronatus, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 82, pl. ii, fig. 6, ☿.

Sungkei, South Perak. February.

Described originally from Mount Ophir, Malacca. Recorded also from Burma.

24. Meranoplus bicolor

Cryptocerus bicolor, *Guér.*, *Cuv. Iconogr. Regn. Anim. Ins.* iii, 1838, p. 425.
Meranoplus bicolor, *Smith*, *Trans. Ent. Soc.* (2), ii (1854), p. 224, pl. xx, fig. 6.

Bukit Besar, Nawngchik.	2,500 feet.	September.
Telôm, Perak-Pahang boundary.	4,000 feet.	January.

'Among long grass.'

Common through the Indo-Malayan region.

PRISTOMYRMEX, Mayr.

25. Pristomyrmex brevispinosus

Pristomyrmex brevispinosus, *Emery*, *Ann. Mus. Civ. Gen.* xxv (1887), p. 451, ☿.

Bukit Besar, Nawngchik. 2,500 feet.

'On ripe fruit.'

Recorded also from the Burma hills and Sumatra.

MONOMORIUM, Mayr.

26. Monomorium latinode

Monomorium latinode, *Mayr.*, *Ann. Mus. Civ. Gen.* ii (1872), p. 152, ☿.

Biserat, Jalor. October.

'Large numbers found in portfolio shut up in box. No nest had been formed, but the workers surrounded three females, each of which occupied a corner of the portfolio.'

Spread throughout India, Ceylon, and Burma.

PHIDOLE, Westw.

27. Phidole megacephala

Formica megacephala, *Fabr.*, *Ent. Syst.* ii, 1793, p. 361.

Pheidole pusilla, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 173, pl. ix, figs. 18-20.

Pheidole megacephala, *Roger*, *Verz. d. Formicid*, 1863, p. 30.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

Of almost universal distribution in both hemispheres.

Dolichoderinae

DOLICHODERUS, Lund.

28. Dolichoderus fuscus

Dolichoderus fuscus, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 509.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

'Surrounding Cicadidae on young shoot of tree.'

Described originally from Tenasserim.

29. Dolichoderus semirugosus

Hypoclinea semirugosa, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xx (1870), p. 956, ☿.

Dolichoderus semirugosus, *Forel*, *Bull. Soc. Vaud. Sc. Nat.* xv, p. 80, 1878, p. 386, ☿.

Biserat, Jalor. October.

Described originally from Borneo.

30. Dolichoderus cuspidatus

Polyrachis cuspidatus, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 63, ☿.

Dolichoderus cuspidatus, *Forel*, *Bull. Soc. Vaud. Sc. Nat.* xv, p. 80, 1878, p. 386, ☿.

Bukit Besar, Nawngchik. 2,500 feet. September.
Telôm, Perak-Pahang boundary. 4,000 feet. January.

'Very numerous on growing fruit in jungle.'

TAPINOMA, Först.

31. Tapinoma melanocephalum

Formica melanocephala, *Fabr.*, *Ent. Syst.* ii, 1793, p. 353, ☿.

Formica nana, *Jerdon*, *Madr. Journ. Lit. and Sc.* xvii, 1851, p. 125, ☿.

Myrmica pellucida, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 124, ☿.

Tapinoma melanocephalum, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xii (1862), p. 651.

Bukit Besar, Nawngchik. October.

Spread through the tropics of both hemispheres.

Camponotinae

OECOPHYLLA, Smith

32. Oecophylla smaragdina

Formica smaragdina, *Fabr.*, *Syst. Ent.*, 1775, p. 828, ☿.

Formica macra, *Guerin Duperry*, *Voy. Coq. Zool.* ii (2), 1850, p. 202, pl. viii, fig. 1, ☿.

Oecophylla smaragdina, *Smith*, *Journ. Linn. Soc.* iv (1860), p. 102.

Ban Sai Kau, Patani, Biserat, Jambu, Nawngchik, South Perak, Upper Perak, Penang, Senggora, Patalung, Trang, and Selangor.

'In the Malay Peninsula it is common everywhere, except in the central jungles and on the hills generally. On Bukit Besar we did not find it above two thousand feet except on one occasion, when two gravid females attempted, without success, to found new colonies in the clearing at two thousand five hundred feet. It is particularly abundant in the sandy wastes round Patani and on the limestone hills near Biserat—both dry localities—and probably cannot stand any great degree of moisture. In these places the nests, which may be either quite near the ground, on stunted bushes, or at the top of jungle trees, attain the dimensions of a football, and several are often found within a radius of a few yards.

'The habits of the "tailor ant," and especially the way in which the larvae are employed in fastening together the leaves out of which the nests are made, have been described by several naturalists, whose observations on the production of silk by the larvae, and on the manner in which they are applied by the workers to any rent in the nest, we can confirm from repeated observation. The food of the species is very varied, consisting partly of other insects and spiders, which the workers can frequently be seen catching at the base of the trees on which their nests occur, and partly of vegetable juices, especially those of fruits like the orange. On the trunks of orange trees bearing ripe fruit two streams of workers can often be distinguished, one ascending with their abdomens small and opaque, the other descending with them distended and translucent. In the nests we found Coccidae, probably kept because of the waxy substance they produced, and small spiders which looked white and bleached. In several instances we also discovered black winged ants belonging to other species, though alien workers were not seen. It is hard to avoid the conclusion that these spiders and ants were mere stalled cattle, preserved to be killed for the food of the community at a seasonable time, for we also saw the workers carrying them into the nest. Some doubt may, however, be cast on this view by another observation, namely, that workers belonging to the species *Oecophylla smaragdina*, but attached to other nests, were seen to be carried in too, apparently without offering resistance or being injured in any way.

'One of us carried out the following experiment several times over:—He took a worker and placed it on a leaf at the entrance to a nest to which it did not belong. It was immediately surrounded by the workers of that nest, who passed all its limbs through their jaws, quite gently, and then hurried it inside. It offered no resistance. A few minutes later the nest was opened and no trace was found of any worker which had been injured or dismembered. To make the experiment absolutely conclusive the introduced worker should have been marked in some way, but we think, even as things were, that the facts go a long way towards proving that the communities of this ant are in the habit of adopting workers from other nests, and it is possible that the winged forms introduced may be brought in accidentally, or through what might be called, for want of a more exact term, stupidity. They did not belong to species which could possibly be confused with *Oecophylla smaragdina*, and mature females of the latter are only found in the nest at swarming time. From this it would appear that the life of a nest cannot last for more than a year, unless gravid females are introduced, for which there is no evidence ; and in any case the leaves out of which the nests are made are always fresh and green.

'Swarming occurs, both in Penang and the Patani States, chiefly in April and May. After the nuptial flight, the males probably die, and the females, after biting off their wings—often leaving a ragged piece of membrane at the base—crawl away and lay their eggs either in a curled-up leaf or, very commonly, at the base of the large, prickly, stiff leaves of a *Pandanus*, out of which hedges are often made. At Ban Sai Kau we found enormous numbers of females in this position in the village hedges late in May. The female sits over her eggs, with her formidable jaws open and pointing in the direction from which danger is most likely to threaten, until the grubs are hatched, but what happens later we do not know ; probably the first batch of workers to reach maturity migrate to a shrub or tree with soft flexible leaves of a convenient size, taking either the female or the immature larvae and pupae, or both, with them, as nests are not made among *Pandanus* leaves, which are far too large, stiff, and heavy to be sewn together, though their prickles and stiffness protect the laying females.

'*Oecophylla smaragdina* is very extensively mimicked in the Malay Peninsula, probably more so than any other insect. Our own collection includes at least three spiders, two larval Hemiptera, a Dipteron, and a newly-hatched mantis (probably *Hierodula modesta*), which resemble it very closely. All of these were taken in an environment which it frequented, though it was not possible to say in any case that an actual bionomic association existed. One of the spiders, probably a species of *Amyciaea*, had captured and was devouring a specimen of the ant. Though *Oecophylla smaragdina* is evidently a successful form, not only having a wide range but also being exceedingly abundant wherever it occurs, it does not lack enemies ; many animals eat it, despite its powerful offensive and defensive weapons. One of us has seen a specimen of the lizard, *Calotes versicolor*, an exceedingly common form in Lower Siam, sitting beside a stream of workers and devouring them as they passed. Several species of squirrel eat it readily, as also do monkeys (*Macacus*), and numbers of small birds. We have taken several spiders (mostly Attidae) feeding on workers. The Siamese and Chinese both use the ant as an article of diet, eating both adults and grubs.'

A common ant throughout the Indo-Malayan and Austro-Malayan regions.

PSEUDOLASIUS, Emery

33. Pseudolasius familiaris

Formica familiaris, *Smith*, *Journ. Linn. Soc.* v (1861), p. 68, ♀.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

'From rotten log in jungle.'

Occurs also in Burma and Tenasserim, and through the Indo-Malayan region.

COLOBOPSIS, Mayr.

34. Colobopsis saundersi

Colobopsis saundersi, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 516, ☿.

♀. Kuala Lumpur, Selangor. April.

'At light; rainy evening.'

Taken also in Tenasserim.

35. Colobopsis pubescens

Colobopsis pubescens, *Mayr.*, *Verh. Zool. Bot. Ges. Wien.* xii (1882), p. 691, ♀, ☿.

Patani. October.

Found also in Burma and Tenasserim. Described originally from the Celebes.

CAMPONOTUS, Mayr.

36. Camponotus mitis

Formica mitis, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 20, ☿.

Formica ventralis, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p 20, ☿.

Camponotus maculatus, *Fabr.*, *race mitis* (*Smith*), *Forel.*, *Journ. Bomb. N. H. Soc.* vii (1892), pp. 230 and 242, ☿.

Camponotus mitis, *Bingh.*, *Faun. Brit. Ind. Hym.* ii, 1903, p. 355, figs. 112 and 113.

Biserat, Jalor. May.

'Under bark of tree.'

Bukit Besar, Nawngchik. 2,500 feet. September.

‘Two nests in rotten wood.’

Spread through the Indo-Malayan region to New Guinea.

37. Camponotus rufoglaucus

Formica rufoglauca, *Jerdon*, *Madr. Journ. Lit. and Sci.* xvii (1851), p. 124.

Camponotus rufoglaucus, *Forel.*, *Journ. Bomb. N. H. Soc.* vii (1892), pp. 226 and 227, ☿.

Biserat, Jalor. October.
Bukit Besar, Nawngchik. 2,500 feet. September.

India ; Ceylon ; Assam ; Burma ; Tenasserim.

38. Camponotus paria

Camponotus micans, *Nzl. race* paria, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 513, ☿.

Camponotus rufoglaucus, *Jerd. race* paria (*Emery*), *Forel.*, *Journ. Bomb. N. H. Soc.* vii (1892), pp. 226 and 238, ☿.

Camponotus paria, *Bingh.*, *Faun. Brit. Ind. Hym.* ii, 1903, p. 384, ♀, ☿.

Mabek, Jalor. July.

‘On yellow pea-like plant in company with several ant-like spiders.’

Found also throughout India; Assam; Burma; Tenasserim, and Ceylon.

39. Camponotus carin

Camponotus dorycus, *Smith*, *race* carin, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 512, ☿.

Camponotus carin, *Emery*, *Dalla. Torre. Cat. Hym.* vii, 1893, p. 23.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

Described originally from Tenasserim.

40. Camponotus angusticollis

Formica angusticollis, *Jerdon*, *Madr. Journ. Lit. and Sci.* xvii, 1851, p. 120, ♀, ☿.

Formica ardens, impetuosa et callida, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, pp. 17 and 18.

Camponotus angusticollis, *Forel.*, *Journ. Bomb. N. H. Soc.* vii (1892), pp. 226 and 235, ☿.

Bukit Besar, Nawngchik. 2,500 feet. August.

‘In dead wood in jungle.’

Common in Western and Central India and Upper Burma.

41. Camponotus gigas

Formica gigas, *Latr.*, *Hist. Nat. Fourm.*, 1802, p. 105, pl. ii, fig. 36, ☿.
Camponotus gigas, *Mayr.*, *Verh. Bot. Ges. Wien.* xii (1862), p. 669, ☿.

Bukit Besar, Mabek, and Kuala Lumpur.

'A common species on jungle paths. I have found solitary female specimens hidden in crevices in tree-trunks in September in Kelantan; Malay name, *semut gajab* (elephant ant).' N.A.

Found throughout the Malay Peninsula, Borneo, and Sumatra, also in the extreme south of Tenasserim.

42. Camponotus camelinus

Formica camelina, *Smith*, *Journ. Linn. Soc.* ii, 1857, p. 57, ☿.
Formica singularis, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 27 (*var.*)
Camponotus camelinus, *Forel.*, *Journ. Bomb. N. H. Soc.* vii (1892), p. 224, ☿.

Bukit Besar, Nawngchik. 2,500 feet. September.

'A solitary specimen running on a gingerwort leaf. A Locustid closely resembling it was taken on the same day on the same plant.'

Recorded also from Sikhim; Assam; Burma and Tenasserim.

43. Camponotus auriventris

Camponotus auriventris, *Emery*, *Ann. Mus. Civ. Gen.* xxvii (1889), p. 514, ☿.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

'In rotten wood.'

Described originally from Burma.

ECHINOPLA, Smith

44. Echinopla melanarctos

Echinopla melanarctos, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 79, pl. i, figs. 25-29, ☿.

Bukit Besar, Nawngchik. August.

Extends to Sumatra and Borneo.

45. Echinopla pallipes

Echinopla pallipes, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 80, ☿.

Telôm, Perak-Pahang boundary. 4,000 feet. January.

Described originally from Borneo, also recorded from Celebes.

POLYRHACHIS, Smith

46. Polyrhachis bihamata

Formica bihamata, *Drury*, *Ill. Nat. Hist.* ii, 1773, p. 73, pl. xxxviii, figs. 7, 8.
Formica affinis, *Le Guillon*, *Ann. Soc. Entr. Fr.* x (1841), p. 314.
Polyrachis bihamata, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 58, pl. i, fig. 9, ☿.

Mabek, Jalor. July.
Bukit Besar, Nawngchik. 2,500 feet. September.

Found throughout the Malayan sub-region : extending to Madagascar.

47. Polyrhachis ypsilon

Polyrhachis ypsilon, *Emery*, *Ann. Mus. Civ. Gen.* xxiv (1886), p. 239, ☿.

Gedong, South Perak. January.

Recorded from the Malayan sub-region and from Ceylon.

48. Polyrhachis armata, var. defensus

Formica armata, *Le Guill.*, *Ann. Soc. Ent. Fr.* x (1841), p. 313, ♂.
Polyrhachis armata, *Forel*, *Journ. Bomb. N. H. Soc.* viii (1893), pp. 26, 34, ☿.

Found also in Burma ; Tenasserim ; Sumatra ; and Java.

49. Polyrhachis laevissima

Polyrhachis laevissima, *Smith*, *Cat. Hym. Brit. Mus.* vi (1858), p. 64, pl. iv, fig. 42, ☿.

Biserat, Jalor. October.

'A very common species at Biserat and also on Cape Patani. At the former locality a nest containing many winged individuals was noted in October. It was in a bamboo which had been cut off in an internode in building a shed. The open end of the cylinder thus exposed, which lay horizontally, was filled in, except for a small aperture above, with a curtain of stout silk interwoven with fragments of bamboo produced by beetles burrowing in the wood. Close to this nest was a clump of acacias, which produced a sweet substance from glands on the leaf-stalks. This was evidently a source of attraction both to the ants and to several other insects. Attidae, apparently belonging to several species, were taken, which appeared to mimic this ant, both on these acacias at Biserat and on other shrubs at Jambu and Cape Patani. Though they were generally found in the immediate vicinity of the insects, a mutual distrust appeared to exist, and an ant which was put into a glass tube with one of the spiders was immediately paralysed by a bite. It was noticed that the spiders were about earlier in the day than the ants, which stayed in their rest until the sun had dispelled the night mist—that is to say, until between nine and ten a.m.'

50. Polyrhachis nigripilosa

Polyrhachis nigripilosa, *Mayr.*, *Ann. Mus. Civ. Gen.* ii (1872), p. 141, ☿.

Biserat, Jalor.		June.
Bukit Besar, Nawngchik.	2,500 feet.	August.

'Running on gingerwort leaf, on which a mimetic (?) parasitic Hymenopteron (mistaken for a larval Locustid, which also resembles it) was captured at the same time.'

51. Polyrhachis mayri

Polyrhachis relucens, *Mayr.* (*nec Latr.*), *Verh. Zool. Bot. Ges. Wien.* xii (1862), p. 685.

Polyrhachis mayri, *Roger*, *Verz. Form. Gatt. N. Art.*, p. 7.

Bukit Besar, Nawngchik. 2,500 feet. September.

'Running about on leaves of low shrubs.'

Found also almost throughout the Indo-Malayan region.

52. Polyrhachis piliventris

Polyrhachis piliventris, *Smith*, *Cat. Hym. Brit. Mus.* vi, 1858, p. 60, pl. iv, fig. 24, ☿.

'The species was taken in nests in tree-trunks on Bukit Besar and at Telôm. In the former locality one of us noted that the ants were accompanied by several individuals of a Reduviid bug, unfortunately immature, which entered the nest with them. It was about the same size as the workers, in some cases rather larger, and bore a generalised resemblance to an ant, especially in its movements, which were very rapid. Its abdomen was broad and flattened from above downwards, with the dorsal surface closely set with short, stiff hairs. On these hairs were fastened the shrivelled bodies of ants apparently belonging to the species under consideration. To a human eye these dead bodies certainly did not increase the bug's resemblance to an individual ant, though they helped to conceal it in a swarm ; but is possible that they may have appealed in some way to the sense of recognition which it is well known that ants possess as regards the members of the community. The bodies were so shrivelled that it is probable that they had been sucked dry before being disposed on the bug's back ; but we were unable to discover anything about the relationship which existed between it and what were probably its victims. The habit is parallelled in a common European Reduviid.'

Originally described from Singapore.

53. Polyrhachis rufipes

Polyrhachis rufipes, *Smith, Cat. Hym. Brit. Mus.* vi, 1858, p. 66, pl. iv, fig 28, ☿.

♀. Biserat, Jalor.

'Running among long grass and low shrubs.'

Corresponding well with the type which is from Borneo.

FOSSORES

MUTILLIDAE

MUTILLA, Linn.

54. Mutilla oculata

(Pl. A, figs. 1, 1a, ♂)

Mutilla oculata, *Fabr., Syst. Piez.*, 1804, p. 432, ♀; ♂, Bingham, *Fasic. Malay. Zool.* vol. 1, appendix p. iii.

Biserat.
Ban Sai Kau, foot of Bukit Besar.
Bukit Besar. 2,500 feet.

Recorded also from China and Cochinchina.

55. Mutilla stephani

Mutilla stephani, *Magr., Ann. Mus. Civ. Gen.* xxxii (1892), p. 227, ♂.

Bukit Besar. 2,500 feet.

This species was described originally from the Karen Hills, in Burma. The ♀ is unknown.

56. Mutilla cariana

Mutilla cariana, *Magr., Ann. Mus. Civ. Gen.* xxxii (1892), p. 231, ♂.

A single ♂ of this very beautiful species obtained on Bukit Besar, at 2,500 feet.

Like the last, originally described from the Karen Hills, Burma. The ♀ is unknown.

57. Mutilla dimidiata

Mutilla dimidiata, *Lepel, Hist. Nat. Ins. Hym.* iii, 1845, p. 628, ♂.
Mutilla rufogastra, *Lepel, l.c.*, p. 629, ♂.
Mutilla sexmaculata, *Smith* (*nec. Swed.*) *Cat. Hym. Brit. Mus.* iii, 1855, p. 37.

Obtained at Biserat.

A common and widely-spread species.

58. Mutilla kirbyi

Mutilla kirbyi, *Magr. Ann. Mus. Civ. Gen.* xxxii (1892), p. 216, ♀.

A single ♀, closely resembling *M. kirbyi* and which, I believe, is a variety of that insect. Differs from the typical form only in colour, as follows : scape of antennae and femora of the posterior pair of legs, red ; basal abdominal segment, black, with no grey pile on it or on the legs.

♀. Bukit Besar. 2,500 feet. 10th May, 1901.

'Taken on flowers on a tree in the jungle.'

59. Mutilla fuscipennis

Mutilla fuscipennis, *Fabr., Syst. Piez.*, 1804, p. 436, ♂.
Mutilla analis, *Lepel, Hist. Nat. Ins. Hym.* iii, 1845, p. 630.

♂. Sungkei. 7th February, 1902.

SCOLLIIDAE

TIPHIA, Fabr.

60. Tiphia rufofemorata

Tiphia rufofemorata, *Smith, Cat.* iii, 1855, p. 83, ♀.

A single ♀. Bukit Besar. 2,500 feet.

Described originally from Northern India; spread generally through India, Burma, and Ceylon.

61. Tiphia fumipennis

Tiphia fumipennis, *Smith, Journ. Linn. Soc.* (1858), p. 90, ♀.

♂. Semangko, Selangor. 2,700 feet.

Originally described from Borneo. Found also in Tenasserim.

62. Tiphia consueta

Tiphia consueta, *Smith, Desc. New. Spec. Hym. Brit. Mus.*, 1879, p. 184, ♀.

A pair, ♂ and ♀, from Bukit Besar and Biserat respectively.

Originally described from Ceylon. The ♂ is similar to the ♀ with, of course, the sexual differences in the abdomen and neuration of the forewing.

SCOLIA, Fabr.

(With three cubital cells in forewing. **Triscolia**)

63. Scolia procera

Scolia procera, *Illig. Mag. f. Insect* i (1802), p. 196, ♀, ♂.
Scolia patricialis, *Burm. Abb. Nat. Ges. Halle.* i, pt. IV (1853), p. 19.

A pair, ♀ and ♂, from Biserat.

Spread generally through the Indo-Malayan region.

64. Scolia rubiginosa

Scolia rubiginosa, *Fabr.*, *Ent. Syst.* ii (1790), p. 230.

Bukit Besar, Biserat, Patani.

A very common species spread through the Indo-Malayan region.

65. Scolia opalina

Scolia opalina, *Smith*, *Journ. Linn. Soc.*, 1858, p. 89, ♀, ♂.

A single very small ♂ from Biserat.

Originally described from Borneo; probably spread in the zones of heavy rainfall throughout the Indo-Malayan region.

66. Scolia capitata

Scolia capitata, *Guer.*, *Voy. Coq.* ii, pt. II (1830), p. 248, ♂.
Scolia ruficeps, *Smith*, *Cat. Hym. Brit. Mus.* iii, 1855, p. 111, ♀, ♂.

A single ♂ from Biserat.

Originally described from the Philippines. Probably with the same distribution as the last.

(With two cubital cells in forewing. **Discolia**)

67. Scolia humeralis

Scolia (Discolia) humeralis, *Sauss.*, *Sauss. and Sich.*, *Cat. Spec. Gen. Scol.*, 1864, p. 321, ♂.
Scolia quadripustulata, *Fabr.*, *var.* humeralis *et bipustulata*, *Magr. Ann. Mus. Civ. Gen.* xxxii (1892), p. 241.

A pair, ♀ and ♂, from Patani.

Originally described from Singapore, extends into Burma. This species is variable in colour. Both specimens in the collection have the abdomen entirely black, with no trace of red; otherwise, however, they agree with SAUSSURE's description, and with specimens in the British Museum collection.

68. Scolia robinsoni

(Pl. A, figs. 2, 2a-2e, ♀)

Scolia robinsoni, *Bingham*, *Fascic. Malay. Zool.*, vol. i, appendix, p. iv.

Bukit Besar. 2,500 feet. 4th September, 1901.

Described from a single ♀.

This very beautiful species is allied to *S. leviceps*, Smith, *S. soror*, Smith, and *S. sarntheinii*, Dalla Torre (= *S. carbonaria*, Sauss. nec. Klug), but can at once be distinguished by the remarkably elongate median segment and by the sculpture.

69. Scolia vollenhoveni

Scolia vollenhoveni, *Sauss.*, *Stett. Ent. Zeit.* xx (1859), p. 188, ♀, ♂.
Scolia (Discolia) vollenhoveni, *Sauss. and Sich.*, *Cat. Spec. Gen. Scol.*, 1864, p. 112, ♀, ♂.

2 ♂'s of this lovely and very distinct little species collected at Biserat.

Originally described from Sumatra. According to Saussure, it occurs also in Turkestan.

ELIS, Fabr.

(With two cubital cells in forewing. **Dielis**)

70. Elis luctuosa

Scolia luctuosa, *Smith*, *Cat. Hym. Brit. Mus.* iii, 1855, p. 101, ♀.

A single typical ♀ collected at Biserat.

A fairly common species throughout the Indo-Malayan region.

71. Elis tristis

Elis (Campsomeris) tristis, *Sauss.*, *Stett. Ent. Zeit.* xx (1859), p. 265, ♀.

A single typical ♀ collected at Patani.

Found pretty well throughout the Indo-Malayan region.

72. Elis fimbriata

Scolia thoracica, *Klug.* (*nec. Fabr.*), *Beitr. z. Naturk* (1805), p. 33.
Scolia fimbriata, *Burm.*, *Abh. Naturf. Ges. Halle* i, pt. iv (1853), p. 25, ♀.
Campsomeris collaris, *Lepel*, *Hist. Nat. Ins. Hym.* iii, 1845, p. 498, ♀.
Elis (Dielis) fimbriata, *Sauss. and Sich.*, *Cat. Spec. Gen. Scol.*, 1864, p. 189, ♀.

3 typical ♀'s procured at Sungkei, in Perak, and at Patani.

A fairly common insect throughout the Indo-Malayan region.

73. Elis annulata

Tiphia annulata, *Fabr.*, *Ent. Syst.* ii, 1793, p. 225, ♀.
Campsomeris servillei, *Lepel*, *Hist. Nat. Ins. Hym.* iii, 1845, p. 501, ♀.
Scolia annulata, *Smith*, *Cat. Hym. Brit. Mus.* iii, 1855, p. 100, ♀.
Elis (Dielis) annulata, *Sauss. and Sich.*, *Cat. Spec. Gen. Scol.*, 1864, pp. 196 and 299, ♀ ♂.

6 ♂ ♂, all taken at Biserat.

This and the ♂♂ of the preceding forms are most difficult to discriminate. *Elis annulata*, ♂, has the clypeus generally marked with yellow ; *E. fimbriata*, ♂, has it generally immaculate, black. The former is also, as a rule, smaller, more slender, with the yellow markings on the abdomen narrower than *E. fimbriata*, ♂, but withal I have seen many specimens that I have been unable to assign to one, rather than to the other form. One such specimen was collected, 9th January, 1902, at Gedong. Like *E. fimbriata*, *E. annulata* is found throughout the Indo-Malayan region.

74. Elis iris

Colpa iris, *Lepel*, *Hist. Nat. Ins. Hym.* iii, 1845, p. 547, ♂.
Elis (Campsomeris) phalerata, *Sauss.*, *Ann. Soc. Ent. Fr.* (3), vi (1858), p. 233, ♀, ♂.
Elis (Dielis) iris, *Sauss. and Sich.*, *Spec. Gen. Scol.*, 1864, p. 201, ♀ ♂, pl. ii, fig. 19, ♀.

A single pair of this beautiful form ; the ♀ from Biserat, ♂ from Telôm.

Found throughout the Indo-Malayan region.

POMPILIDAE

POMPILUS, Fabr.

75. Pompilus analis

Sphex analis, *Fabr.*, *Spec. Ins.* i, 1781, p. 448.
Sphex sanguinea, *Christ. Naturg. d. Ins.*, 1791, p. 291, ♀, pl. xxviii, fig. 6.
Pompilus analis, *Fabr.*, *Suppl. Ent. Syst.*, 1798, p. 246.

A single ♀ from Patani.

Occurs throughout the Indo-Malayan region.

76. Pompilus unifasciatus

Pompilus unifasciatus, *Smith*, *Cat. Hym. Brit. Mus.* iii, 1855, p. 145, ♀, ♂.

A single ♀ from Bidor.

Common throughout India, Burma, Malacca, to China and Japan.

77. Pompilus bracatus

Pompilus bracatus, *Bingh.*, *Journ. Bomb. N. H. Soc.* v (1890), p. 236, ♀.

Biserat.

A common species, also from Sikhim to Tenasserim, and I have seen specimens from Japan.

78. Pompilus clotho

Pompilus clotho, *Smith*, *Desc. New Sp. Hym. Brit. Mus.*, 1879, p. 146, ♀.

A single ♀ from Biserat.

Originally described from Sumatra.

PSEUDAGENIA, Kohl.

79. Pseudagenia aegina

Agenia aegina, *Smith*, *Journ. Linn. Soc.* ii, 1857, p. 94, ♀.
Pseudagenia aegina, *Kohl.*, *Verh. Zool. Bot. Ges. Wien.* xxxiv, 1884, p. 42.

A single ♀ from Kampong Mabek.

Throughout the Indo-Malayan region.

80. Pseudagenia clypeata

Pseudagenia clypeata, *Bingh.*, *Journ. Linn. Soc.*, 1896, p. 427.

♀. Bukit Besar. 2,500 feet.

Described originally from Burma.

81. Pseudagenia marpesia

(Plate A, figs. 3, 3a, 3b, ♀)

Pseudagenia marpesia, *Bingham*, *Fascic. Malay. Zool.*, vol. i, Appendix, p. iv.

Bukit Besar. 28th August, 1901.

'Flying in clearing at midday carrying a large spider.'

CEROPALES, Latr.

82. Ceropales pernix

Ceropales pernix, *Bingh.*, *Journ. Linn. Soc.*, 1896, p. 425, ♂.

♂. Sungkei. 11th February, 1902.

'On flowers.'
Common in Tenasserim.

83. Ceropales ligea

(Plate A, figs. 4, 4a-4c, ♀)

Ceropales ligea, *Bingham*, *Fascic. Malay. Zool.*, vol. i, Appendix, p. v.

Sungkei, South Perak. 11th February, 1902.

In a collection of Burmese hymenoptera which I have not yet worked out there are two ♀'s of this species.

MACROMERIS, Lepel

84. Macromeris violacea

Macromeris violacea, *Lepel*, *Magas. Zool.* i (1831), pp. 29 and 30, pl. xxx, ♂.

2 ♀'s. Jeram Kawan.

Fairly common from Bengal to New Guinea.

SALIUS, Fabr.

(**Priocnemis.** Tarsal claws unidentate)

85. Salius verticalis

Priocnemis verticalis, *Smith*, *Journ. Linn. Soc.*, 1857, p. 94, ♀.
Salius verticalis, *Kobl.*, *Verb. Zool. Bot. Ges. Wien.* xxxiv (1884), p. 45.

A single ♀ from Bukit Besar.

Common in Burma and extending into the Malayan sub-region.

86. Salius iridipennis

Mygnimia iridipennis, *Smith*, *Journ. Linn. Soc.*, 1857, p. 98, ♀.
Salius iridipennis, *Cam. Mem. Manch. L. and Ph. Soc.* (4), iv (1891), p. 444.

A single ♀ from Bukit Besar.

Occurs in the Indo-Malayan region from Sikhim to Borneo.

87. Salius bipartitus

Calicurgus bipartitus, *Lepel*, *Hist. Nat. Ins. Hym.* iii, 1845, p. 406.
Priocnemis peregrinus, *Smith*, *Trans. Ent. Soc.*, 1875, p. 37.
Salius bipartitus, *Bingh.*, *Faun. Ind. Hym.* i, 1897, p. 137, ♂, pl. ii, fig. 1.

♀. Mabek. 24th July, 1901.
♀. Biserat. 18th October, 1901.

88. Salius javanus

Calicurgus javanus, *Lepel, Hist. Nat. Ins. Hym.* iii, 1845, p. 408.
Pompilus javanus, *Smith, Cat. Hym. Brit. Mus.* iii, 1855, p. 146.

♀. Gedong. 9th January, 1902.

Spread through the Malayan sub-region.

89. Salius sericosoma

Pompilus sericosoma, *Smith, Cat. Hym. Brit. Mus.* iii, 1855, p. 146, ♀.
Salius (Priocnemis) sericosoma, *Kohl., Verh. Zool. Bot. Ges. Wien.* xxxiv (1884), p. 45.

♀. Bukit Besar. 2,500 feet.

Described originally from Sumatra. Common in Tenasserim.

Hemipepsis, Dahlb. (Tarsal claws bidentate)

90. Salius ducalis

Mygnimia ducalis, *Smith, Journ. Linn. Soc.*, 1857, p. 98, ♀.
Salius ducalis, *Kohl., Verh. Zool. Bot. Ges. Wien.* xxxiv (1884), p. 45.

A single ♀ of this magnificent species, which seems to be confined to Siam and the Malay peninsula, was procured in the Batang Padang district. In Borneo the very closely allied form *S. princeps*, SMITH, is mimicked by *Nothopeus fasciatipennis*, WATERHOUSE, a longicorn beetle with remarkably short elytra (see *Trans. Ent. Soc.*, 1885, p. 369, pl. x, figs. 11 and 12.

91. Salius ceylonicus

Hemipepsis flava, ♀ var., *Dahlb., Hym. Eur.* i, 1843, p. 462 (*nec.* Priocuemis flavus, *Dblb. t.c.*, p. 457).
Mygnimia ceylonica, *Sauss., Novara Reise Hym.* (1867), p. 64, ♀.
Salius ceylonica, *Cam. Mem. Manch. Lit. and Phil. Soc.* x (1896), p. 215, pl. ii, figs. 3 and 4.

A single ♀ from Telôm. 4,000 feet.

Found also in India, Burma, and Ceylon.

92. Salius aureosericeus

Pompilus aureosericeus, *Guér. Voy. Coq. Zool.* ii, pt. 11, 1830, p. 256, ♀.
Mygnimia aureosericea, *Smith, Cat. Hym. Brit. Mus.* iii, 1855, p. 182.
Salius aureosericeus, *Kohl., Verb. Zool. Bot. Ges. Wein.* xxxiv (1884), p. 45.

A single ♂ taken at Biserat.

Recorded also from Southern India, Tenasserim, and Java. There is great variation in size in this form, and also in venation.

SPHIGIDAE

TACHYTES, Panz.

93. Tachytes modesta

Tachytes modestus, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 299, ♀.

♀. Biserat, 19th October, 1901.

Recorded from India, Burma, Tenasserim, and China.

LARRA, Latr.

94. Larra carbonaria

Larrada carbonaria, *Smith*, *Journ. Linn. Soc.*, 1858, p. 102, ♀.
Larra carbonaria, *Kohl.*, *Verb. Zool. Bot. Ges. Wien.*, 1884, p. 242.

2 ♀'s. Semangko Pass. From 2,700 to 3,000 feet. May, 1902.

Described originally from Singapore.

95. Larra nana

Larra nana, *Bingh.*, *Faun. Brit. Ind. Hym.* i, 1897, p. 200, ♀.

♂, ♀. Gedong, Bukit Besar. 2,500 feet.

Described originally from Tenasserim. ♂ similar to ♀, but smaller, with sculpture a little coarser.

NOTOGONIA, Costa.

96. Notogonia laboriosa

Larrada laboriosa, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 278, ♀.
Larra laboriosa, *Kohl.*, *Verb. Zool. Bot. Ges. Wien.* xxxiv (1884), p. 245.
Notogonia laboriosa, *Cam. Ent. M. Mag.* xxvi (1890), p. 314.

♀. Cape Patani. 25th January, 1902.

Extends from Burma and Tenasserim to the Philippines.

LIRIS, Fabr.

97. Liris aurata

Sphex aurata, *Fabr.*, *Mant. Ins.* i, 1787, p. 276.
Pompilus auratus, *Fabr.*, *Suppl. Ent. Syst.*, 1798, p. 250.
Liris aurata, *Fabr.*, *Syst. Piez.*, 1804, p. 228.
Larrada aurulenta, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 276, pl. vii, fig. 5, ♀.

♀. Biserat. 26th June, 1901.
♀. Mabek. 27th July, 1901.

'Flying in rice-field.'

A common and widely-spread insect from Eastern Africa, through Persia, India, Burma, China, Japan, and the Malayan sub-region.

LYRODA, Say.

98. Lyroda venusta

Lyroda venusta, *Bingh.*, *Faun. Brit. Ind. Hym.* i, 1897, p. 210, ♀.

♀. Biserat.

'Flying about in low vegetation in orchard at dusk.'

Described originally from Burma.

TRYPOXYLON, Latr.

99. Trypoxylon bicolor

Trypoxylon bicolor, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 377, ♀.

♀. Biserat.

'Collecting mud from puddle at edge of jungle path.'

AMMOPHILA, Kirby

100. Ammophila atripes

Ammophila atripes, *Smith*, *A.M.N.H.* (2), ix (1852), p. 46.
Ammophila simillima, et pulchella, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, pp. 217 and 218.
Ammophila spinosa, *Smith*, *A.M.N.H.* (4), xii (1873), p. 259, ♀.
Ammophila buddha, *Cam. Mem. Manch. L. and Ph. Soc.* (4), ii (1889), pp. 93 and 94.

♀. Biserat.

'Among bushes at edge of rice-field—dusk.'

Both this and the next form are common, and spread generally through the Indo-Malayan region.

101. Ammophila nigripes

Ammophila nigripes, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 215, ♂.

♂. Sungkei. 10th February, 1902.

'On sand.'

India, Burma, Sumatra, Borneo.

SCELIPHRON, Klug.

102. Sceliphron javanum

Pelopoeus javanus, *Lepel, Hist. Nat. Ins. Hym.* iii, 1845, p. 309, ♀.
Sceliphron javanum, *Dalla. Torre., Cat. Hym.* viii, 1897, p. 386.

2 ♀'s. Biserat. June to October, 1901.
Jalor. June, 1901.

'Building clay nests inside houses.'

Spread through the Indo-Malayan region.

103. Sceliphron madraspatanum

Sphex madraspatanus, *Fabr., Ent. Syst.* ii, 1793, p. 204.
Pelopoeus madraspatanus, *Fabr., Syst. Piez.*, 1804, p. 203.
Pelopoeus separatus, *Smith, A.M.N.H.* (2), ix (1852), p. 47.
Sceliphron madraspatanum, *Klug., Neu. Schrift. Ges. Naturf. Fr. Berlin* iii (1801), p. 565.

2 ♀'s. Biserat.

'Flying about house in midday.'

Found throughout the Indo-Malayan region.

104. Sceliphron violaceum

Sphex violacea, *Fabr., Syst. Ent.*, 1775, p. 346.
Pelopoeus violaceus, *Ach. Costa. Ann. Mus. Zool. Napoli.* iv (1867), p. 76.
Sceliphron violaceum, *Dalla. Torre., Cat. Hym.* viii, 1897, p. 392.
Pelopoeus bengalensis, *Smith, Cat. Hym. Brit. Mus.* iv, 1856, p. 230.

♀. Biserat, 24th October, 1901.

Spread through the Ethiopian and Indo-Malayan regions.

SPHEX, Linn (apud Kohl.)

105. Sphex lobatus

Sphex lobatus, *Fabr., Syst. Ent.*, 1775, p. 348.
Sphex smaragdinus, *Drury, Ill. Exot. Ius.* iii, 1782, p. 57, pl. xlii. fig. 2.
Sphex coerulea, *Christ., Naturg. d. Ins.*, 1791, p. 308, pl. xxx, fig. 6, ♀.
Chlorion lobata, *Latr., Hist. Nat. Ins.* iii, 1802, p. 330.

2 ♀'s. Bukit Besar, Biserat, Patani

Common throughout the Indo-Malayan region.

106. Sphex aurulentus

Sphex aurulenta, *Fabr.*, *Mant. Ins.* i, 1787, p. 274.
Sphex ferruginea, *Lepel*, *Hist. Nat. Ins. Hym.* iii, 1845, p. 345, ♀.
Sphex aurulentus, *Kohl.*, *Ann. Naturh. Hofences* x, 1895, p. 53, ♀, ♂.

2 ♀'s. Bidor, South Perak. 3rd to 20th February, 1902.

Common throughout the Indo-Malayan region.

BEMBEX, Fabr.

107. Bembex trepanda

Bembex trepanda, *Dahlb.*, *Hym. Eur.* i, 1845, pp. 181 and 490.

♀. Patani.

'Flying with great rapidity over sand at midday.'

Found generally spread through the Indo-Malayan region.

STIZUS, Latr.

108. Stizus simillimus

Larra simillina, *Smith*, *Journ. Linn. Soc.* iii, 1858, p. 159, ♀.
Stizus simillimus, *Handl. Sitzber. Akad. Wiss Wien.* ci, 1892, p. 56.

♀. Sungkei. 11th February, 1902.

'Carrying off Homopteron of greater bulk than itself; clasped its prey by the head with its second legs.'

A wide-spread form.

CERCERIS, Latr.

109. Cerceris ferox

Cerceris ferox, *Smith*, *Cat. Hym. Brit. Mus.* iv, 1856, p. 454, ♀.

♀. Biserat.

Occurs in Tenasserim and in Sumatra.

110. Cerceris pictiventris

Cerceris pictiventris, *Dahlbom.*, *Hym. Eur.* i, 1845, p. 498.
Cerceris novarae, *Sauss.*, *Novara Reise Hym.*, 1867, p. 92, ♀.
Cerceris fervens, *Smith*, *A.M.N.H.* (4) xii (1873), p. 411, ♀.

♀. Biserat. 20th October, 1901.

Found throughout India, Ceylon, Burma, and Tenasserim.

111. Cerceris annandali

(Plate A, figs. 5, 5a, ♂)

Cerceris annandali, *Bingham*, *Fascic. Malay. Zool.*, vol. i, Appendix, p. v.

Biserat. 20th October, 1901.

'Issuing from small hole at edge of jungle path.'

DIPLOPTERA

EUMENIDAE

EUMENES, Latr.

112. Eumenes circinalis

Eumenes circinalis, *Fabr.*, *Syst. Piez.*, 1804, p. 286; *Sauss.*, *Etud. Faun. Vesp.* i, 1852, p. 47, pl. x, fig. 7, ♀, ♂.

3 ♀'s. Bukit Besar, Biserat, Sungkei.

'Flying about sandy road at midday.'

Extends from India to Australia.

113. Eumenes lenis

Eumenes lenis, *Bingh.*, *Faun. Brit. Ind. Hym.* i, p. 347, ♀.

♀. Bidor. 23rd August, 1902.

Described originally from Burma.

114. Eumenes arcuata

Vespa arcuata, *Fabr.*, *Syst. Ent.*, 1775, p. 371.

Eumenes arcuata, *Fabr.*, *Syst. Piez.*, 1804, p. 287; *Sauss.*, *Etud. Vesp.* i, 1852, p. 63, ♀.

♀. Bukit Besar. 2,500 feet. 2nd September, 1901.

'Flying at midday near clay bank in clearing.'

One of the commonest of the solitary wasps in Burma.

RHYNCHIUM, Sauss.

115. Rhynchium brunneum

Vespa brunnea, *Fabr.*, *Ent. Syst.* ii, 1793, p. 264.

Vespa carnatica, *Fabr.*, *Ent. Syst. Suppl.*, 1798, p. 261.

Rygchium brunneum et carnaticum, *Sauss.*, *Etud. Faun. Vesp.* i, 1852, p. 112, pl. xiv, fig. 4, ♂, ♀.

Rhynchium brunneum, *Smith*, *Cat. Hym. Brit. Mus.* v, 1857, p. 44.

♀. Biserat. 12th August, 1901.

'From flowers of *Mimosa pudica*; midday.'

A very common wasp throughout the Indo-Malayan region. DALLA TORRE, in his Catalogus Hymenopterorum, puts it as a variety of the next species. The two races are certainly very closely allied.

116. Rhynchium haemorrhoidale

Vespa haemorrhoidalis, *Fabr.*, *Syst. Ent.*, 1775, p. 366.

Odynerus dimidiatus, *Guer.*, *Voy. Belang. Zool.*, 1834, p. 503; *Atlas*, *Ins.*, pl. iv, fig. 4.

Rhygchium haemorrhoidale, *Sauss.*, *Etud. Faun. Vesp.* i, 1852, p. 109, ♀, ♂.

Rhynchium haemorrhoidale, *Smith*, *Cat. Hym. Brit. Mus.* v, 1857, p. 44, ♀.

Bidor.	3rd February, 1902.
Sungkei.	10th February, 1902.
Biserat.	15th October, 1901.
Jambu.	6th June, 1901.

'On flowers of shrub.'

Common throughout the Indo-Malayan region.

117. Rhynchium smithi

Rhynchium smithii, *Sauss.*, *Etud. Faun. Vesp.* iii, 1856, p. 174, ♂.

Jambu. 6th June, 1901.

'A pair on flowers of shrub.'

The ♀ resembles the ♂, but is larger. Neither specimen is quite typical, differing from specimens in the British Museum collection in the wings being more hyaline at base, and having a deep blue, not purplish, refulgence.

ODYNERUS, Latr.

118. Odynerus fraternus

Odynerus fraternus, *Bingh.*, *Faun. Brit. Ins. Hym.* i, 1897, p. 366, ♀.

2 ♀'s. Biserat. 23rd October, 1901.

Identical with the type from Tenasserim.

119. Odynerus septemfasciatus

Odynerus septemfasciatus, *Smith*, *Journ. Linn. Soc.* ii (1858), p. 110, ♂; *Gribobo*, *Bull. Soc. Ent. Stal.* xxiii (1891), p. 295, ♀.

Biserat. 12th October, 1901.

A single ♀ resembling the ♀ described by GRIBOBO from Sumatra, as having the 'facies of species' of the genus *Vespa*. The type specimen, a ♂ in the collection of the British Museum, is from Borneo.

VESPIDAE

ISCHNOGASTER, Guér.

120. Ischnogaster fraterna

Ischnogaster fraterna, *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 378, ♀, ♂.

Bukit Besar. 3,500 feet. 29th April, 1901.

'Flying about and resting on leaves.'

Originally described from Tenasserim.

121. Ischnogaster eximia.

Ischnogaster eximia, *Bingh., Journ. Bomb. N. H. Soc.* v (1890), p. 244, ♀, fig. nest.

A single ♀; no locality.

Described originally from Ceylon. I have received specimens lately from Burma and Pahang, Malay Federated States.

122. Ischnogaster nitidipennis

(Plate A, figs. 6, 6a, 6b, ♀)

Ischnogaster nitidipennis, *Sauss., Etud. Faun. Vesp.* ii, 1853, p. 10, pl. xxxiv, fig. 4, ♂.

A single ♀. Bukit Besar. 2,500 feet. 25th August, 1901.

Not uncommon in Tenasserim. Saussure described it from Cayenne in America, but I suspect an error in locality, as all the rest of the known forms of *Ischnogaster* are from the Indo-Malayan region.

123. Ischnogaster nigrifrons

Ischnogaster nigrifrons, *Smith, Journ. Linn. Soc.* ii (1857), p. 113, ♀.

Biserat, Sungkei, and Jeram Kawan.

Noted as very common, and fastening its cells to fibres that have become separated from wooden rafters. In Tenasserim, where it is very common, it fastens its cells to detached straws in the roofs of native houses, rest houses, etc. A nest was figured in my paper, *Journ. Bomb. N. H. Soc.* v, 1890, pp. 233-252.

POLYBIA, Lepel.

124. Polybia sumatrensis

Polybia sumatrensis, *Sauss., Rev. et Mag. Zool.,* 1855, p. 374.

Bukit Besar, Biserat, and Sungkei.

'Flying in numbers round the tops of the bananas, evening.'

Spread through the Indio-Malayan region.

ICARIA, Sauss.

125. Icaria variegata

Epipona variegata, *Smith*, *A. M. N. H.* (2), ix (1852), p. 48.
Icaria variegata, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 237.
Icaria picta, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 238.
Icaria pendula, *Smith*, *Cat. Hym. Brit. Mus.* v, 1857, p. 98, ♀.

Biserat. 4th July, 1901

'Two individuals with unfinished nest. They were working together alone on the nest, which depended from midrib of the leaf of a shrub in a buffalo lawn.'

Originally described from India. Common throughout Burma and Tenasserim.

126. Icaria hongkongensis

Icaria hongkongensis, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853, p. 239, ☿.

A single specimen without locality or date.

Described originally from China.

127. Icaria flavo-picta

Icaria flavo-picta, *Smith*, *Cat. Hym. Brit. Mus.* v, 1857, p. 99, ♀.

Biserat, Bukit Besar, Sungkei.

Originally described from Borneo.

128. Icaria speciosa

Icaria speciosa, *Sauss.*, *Rev. et Mag. Zool.*, 1855, p. 374.

Biserat, Sungkei, Semangko Gap. 2,700 feet.

Common through Burma, Tenasserim, and the Malayan sub-region.

POLISTES, Latr.

129. Polistes sagittarius

Polistes sagittarius, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 56.

Bukit Besar.

'Malay name, "*Tembuang*".'

Common through India, Burma, and Tenasserim. Described originally from China.

130. Polistes stigma

Vespa stigma, *Fabr.*, *Ent. Syst.* ii, 1793, p. 275.
Vespa tamula, *Fabr.*, *Ent. Syst. Suppl.*, 1798, p. 263.
Polistes stigma, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 64, pl. vi, fig. 3, ☿.

Bidor. 3rd February, 1902.
Sungkei. 11th February, 1902.

'On flowers.'

Common throughout the Indo-Malayan region. *P. stigma* is merely a geographical race of *P. marginalis*, Fabr., from Africa.

131. Polistes hebraeus

Vespa hebraea, *Fabr.*, *Mant. Ins.* i, 1787, p. 292.
Polistes hebraea, et macaensis, *Fabr.*, *Syst. Piez.*, 1804, pp. 272 and 273.
Vespa undata, *Oliv.*, *Encycl. Méth.* vi, 1791, p. 684.
Polistes hebraeus, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 53, ☿.

Bukit Besar. 2,500 feet. 30th April, 1901.

'Nest from small sapling ; stings badly.'

A very wide spread and variable species, occurring in Egypt, Arabia, and Persia, and from Mauritius to the Philippines. The two species in the collection are richly marked with chestnut, black, and yellow. I have similar specimens from the Shevaroy hills in Southern India.

VESPA, Linn.

132. Vespa dorylloides

Vespa anomala, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 112, pl. xiv, fig. 2, ☿.
Vespa dorylloides, *Sauss.*, *Etud. Faun. Vesp.* ii, 1853-59, p. 256 (*Errata*).

Telôm. 27th January, 1902.
Bidor. 2nd February, 1902.
Sungkei. 8th February, 1902.

'Although it was abundant every evening in South Perak in January and February, we did not see this species once during the nine months, April to December, spent in the Patani States.'

Common throughout India, Burma, and Tenasserim, extending to Java. More or less crepuscular in habits.

133. Vespa magnifica

Vespa magnifica, *Smith*, *Trans. Ent. Soc. new ser.* ii (1852), p. 45.

Bukit Besar. 2,500 feet. 31st August, 1901.

A single small ☿

Described originally from the Himalayas. Found at high elevations throughout Assam, Burma, and Tenasserim.

134. Vespa cincta

Vespa cincta, *Fabr.*, *Syst. Ent.*, 1775, p. 362.
Vespa affinis, *Fabr.*, *Mant. Ins.* i, 1787, p. 287.
Vespa unifasciata, *Oliv.*, *Encycl. Méth.* vi, 1791, p. 677.

Biserat and Patani.

A single ♀ and several ☿'s.

A common Indian and Malayan wasp. The amount of yellow on the abdomen is very variable.

135. Vespa auraria

Vespa auraria, *Smith*, *Trans. Ent. Soc.* (2) ii (1852), p. 46, ♀, pl. viii, fig. 8, ♀.

Telôm. 4,000 feet. 23rd January, 1902.

'Closely mimicked by a Syrphid fly taken on the same day and in the same part of the jungle.'

Described originally from the Himalayas. I procured it at high elevations in Tenasserim.

ANTHOPHILA

COLLETIDAE

PROSOPIS, Fabr.

136. Prosopis mixta

Prosopis mixta, *Smith*, *A. M. N. H.* (2) ix (1852), p. 50, ♀.
Prosopis leucotarsis, *Cam.*, *Mem. Manch. L. and Ph. Soc.* xli, 1897, No. iv, p. 90.

Biserat. 21st October, 1901.

Described by SMITH, from India; no precise locality. Has not yet been recorded from Burma or Tenasserim.

APIDAE

SPHECODES, Latr.

137. Sphecodes crassicornis.

Sphecodes crassicornis, *Smith*, *New. sp. Hym. Brit. Mus.*, 1879, p. 28, ♂.
Sphecodes sodalis, *Smith*, *t.c.*, p. 28, ♂.

♂. Biserat. 6th August, 1901.
♀. Sungkei. 11th February, 1902.

The type specimen, a ♂, is from Calcutta. The ♀ closely resembles the ♂, but is slightly larger and has no black at the base of the abdomen.

HALICTUS, Latr.

138. Halictus validus

(Plate A, figs. 7, 7a, ♀)

Halictus validus, *Bingh.*, *Fascic. Malay. Zool.*, vol. 1, Appendix, p. v.

Biserat, Jalor.

Described from three specimens taken in August and October.

NOMIA, Latr.

139. Nomia iredescens

Nomia iredescens, *Smith*, *Journ. Linn. Soc.* ii (1858), p. 43, ♀.

Bukit Besar. 1,000 feet. 27th April, 1901.

'This bee, with several other specimens, was crawling on the surface of a small puddle on the top of a rock in the middle of a stream. In the puddle were numerous Dipterous larvae.'

Common in Tenasserim.

140. Nomia rustica

Nomia rustica, *Westw.*, *Trans. Ent. Soc.*, 1875, p. 214, ♂.

Biserat. 7th July, 1901.

'Among short grass in pasture land.'

Described originally from Ceylon.

141. Nomia terminata

Normia terminata, *Smith*, *Trans. Ent. Soc.*, 1875, p. 56, ♂.

♀. Semangko, Selangor. 2,700 feet. 14th May, 1902.

Recorded from Sikhim, Burma, and Tenasserim.

NOMADA, Scop.

142. Nomada adusta

Normada adusta, *Smith*, *Trans. Ent. Soc.*, 1875, p. 50, ♂, ♀.

Biserat. 17th October, 1901.

A variable insect found throughout Indo-Malayan region.

LITHURGUS, Latr.

143. Lithurgus atratus

Lithurgus atratus, *Smith*, *Cat. Hym. Brit. Mus.* i, 1853, p. 145, ♀.

Jeram Kawan, South Perak. 12th February, 1902.

Found throughout the Indo-Malayan region.

MEGACHILE, Latr.

144. Megachile atrata

Megachile atrata, *Smith*, *Cat. Hym. Brit. Mus.* i, 1853, p. 182, ♀.
Megachile fulvipennis, *Smith*, *New. sp. Hym. Brit. Mus.*, 1879, p. 68, ♀ var.

Biserat, Jalor. 29th June, 1901.

'On flowers of a tall yellow pea.'

Three specimens of the variety named *Fulvipennis*, by SMITH. Recorded from Burma, Tenasserim, the Nicobars, and the Philippines.

145. Megachile bellula

Megachile bellula, *Bingh.*, *Faun. Brit. Ind. Hym.* i, p. 476, fig. 158, ♂, ♀.

Biserat, Jalor. 29th June, 1901.

'On flowers of a tall yellow pea, with the preceding species.'

Described originally from Burma and Tenasserim. Found also in Sumatra.

146. Megachile disjuncta

Apis disjuncta, *Fabr.*, *Ent. Syst.* ii, 1793, p. 328.
Megachile disjuncta, *Lepel*, *Hist. Nat. Ins. Hym.* ii, 1841, p. 331, ♀.

Biserat. 12th July, 1901.

'Flying in house.'

A common Indo-Malayan species. Builds its nests in houses.

147. Megachile velutina

Megachile velutina, *Smith*, *Cat. Hym. Brit. Mus.* i, 1853, p. 180, ♀.

Biserat. 22nd October, 1901.

'Flying about house-post.'

A common species in Tenasserim.

ANTHIDIUM, Fabr.

148. Anthidium minutissimum

(Plate A, fig. 8, ♀)

Anthidium minutissimum, *Bingh.*, *Fascic. Malay.*, vol. i, Appendix, p. vi.

Biserat, Jalor. 18th September, 1901.

'Flying among low shrubs in the open.'

PAREVASPIS, Ritsema

149. Parevaspis abdominalis

Stelis abdominalis, *Smith*, *Journ. Linn. Soc.* iii, 1859, p. 7, ♂.
Parevaspis abdominalis, *Dalla. Torre.*, *Cat. Hym.* x, p. 480.

Biserat, Jalor. 23rd October, 1901.

Common throughout the Indo-Malayan region.

CERATINA, Latr.

150. Ceratina sexmaculata

Ceratina sexmaculata, *Smith*, *New sp. Hym. Brit. Mus.*, 1879, p. 92, ♂.

Biserat. August and October.

'Flying about in low vegetation.'

Extends from China, through Burma to the Malayan sub-region.

151. Ceratina perforatrix

Ceratina perforatrix, *Smith*, *New sp. Hym. Brit. Mus.*, 1879, p. 92, ♂.

Sungkei, South Perak. 7th June, 1902.

'Taken on flowers.'

One of the largest and most beautiful of the genus. Has been recorded also from Assam, Burma, and Tenasserim.

152. Ceratina hieroglyphica

Ceratina hieroglyphica, *Smith*, *Cat. Hym. Brit. Mus.* ii, 1854, p. 226, ♂, ♀.
Ceratina flavopicta, *Morawitz* (*nec Smith*), *Hor. Soc. Ent. Ross* xxiv (1890), p. 356.
Ceratina morawitzii, *Stadehn.*, *Zool. Jahrb. Syst.* viii (1894), p. 233.

Biserat. 6th February, 1902.
Sungkei. 6th February, 1902.

'On flowers.'

Common throughout the Indo-Malayan region.

COELIOXYS, Latr.

153. Coelioxys ducalis

(Plate A, fig. 9, ♀)

Coelioxys ducalis, *Smith*, *Cat. Hym. Brit. Mus.* ii, 1854, p. 267.

♀. Bukit Besar. 2,500 feet. 7th August, 1891.

SMITH recorded this magnificent form from India with a doubt. So far as I know, it has not been again procured till collected by Messrs. ANNANDALE and ROBINSON.

154. Coelioxys basalis

Coelioxys basalis, *Smith*, *Trans. Ent. Soc.*, 1875, p. 48, ♂, ♀.

Biserat. 23rd October, 1901.

Common throughout India, Burma, and Tenasserim.

CROCISA, Jurine

155. Crocisa decora

Crocisa decora, *Smith*, *Trans. Ent. Soc.* (2) ii, pt. II (1852), p. 41, ♀.
Crocisa emarginata, pt. *Bingh.* (*nec Lepel*), *Faun. Brit. Ind. Hym.* i, 1897, p. 517, ♂, ♀.

Cape Patani. 10th June, 1901.

'On flowers of shrub.'

Originally described from China.

PODALIRIUS, Latr.

156. Podalirius zonatus

Apis zonata, *Linn.*, *Syst. Nat.*, *10th ed.*, i, 1758, p. 576.
Anthophora subcoerulea, *Lepel*, *Hist. Nat. Ins. Hym.* ii, 1841, p. 30, ♂, ♀.
Anthophora zonata, *Smith*, *Cat. Hym. Brit. Mus.* ii, 1854, p. 336.

Biserat. August, 1901.

Common throughout the Indo-Malayan region, and extending to Australia.

XYLOCOPA, Latr.

157. Xylocopa latipes

Apis latipes, *Drury*, *Ill. Exot. Ins.* ii, pl. xlviii, fig. 2, ♂.
Xylocopa latipes, *Fabr.*, *Syst. Piez.*, 1804, p. 337.

Ban Sai Kau, Nawngchik; Biserat; Sungkei; Tenelong, South Perak.

'Exceedingly abundant; mines into woodwork of houses and does great damage.'

Found throughout the Indo-Malayan region.

158. Xylocopa auripennis

Xylocopa auripennis, *Lepel*, *Hist. Nat. Ins. Hym.* ii, 1841, p. 181, ♂, ♀.

Biserat, Bukit Besar. Two rather large ♀'s.

Found throughout the Indo-Malayan region.

159. Xylocopa collaris

Xylocopa collaris, *Lepel, Hist. Nat. Ins. Hym.* ii, 1841, p. 189, ♀.
Xylocopa dejeanii, *Lepel, Hist. Nat. Ins. Hym.* ii, 1841, p. 209, ♂.

Bukit Besar. 2 ♂'s. 30th August, 1901.
Biserat. ♂. 20th October, 1901.

A common species in the Indo-Malayan region.

160. Xylocopa caerulea

Bombus caeruleus, *Fabr., Syst. Piez.*, 1804, p. 345.
Xylocopa caerulea, *Lepel, Hist. Nat. Ins. Hym.* ii, 1841, p. 200, ♀.

Bukit Besar. 2,500 feet.

'In branch of dead wood, about two inches in diameter; found when cutting up sticks for firewood. The gallery in one instance was about nine inches long, and contained four bees. All the specimens, including the one just hatched, were infested with mites, which inhabited a hole in the forepart of the abdomen.'

Sparsely spread through the Indo-Malayan region.

161. Xylocopa aestuans

Apis aestuans, *Linn., Syst. Nat. ed.* 10, i, 1758, p. 579, ♀.
Xylocopa aestuans, *Lepel, Hist. Nat. Hym.* ii, 1841, p. 193, ♂, ♀, pl. xvii, fig. 3, ♀, fig. 4, ♂.

Patani, Bukit Besar, and Biserat. June to October.

'Malay name "*Kumbang*," a general name applied to all species of the genus *Xylocopa*.'

A common Indo-Malayan species.

APIS, Linn.

162. Apis dorsata

Apis dorsata, *Fabr., Ent. Syst.* ii, 1793, p. 328.
Apis bicolor, *Klug., Mag. n. Ent. Ges. Naturk. Berlin*, i (1807), p. 264, pl. vii, fig. 3.
Apis nigripennis, *Lepel, Hist. Nat. Ins. Hym.* i, 1841, p. 403.
Apis testacea, *Smith and* Zonata, *Smith* (*nec Guerin*), *Journ. Linn. Soc.* ii (1858), p. 49, and iii (1859), p. 8.

Bukit Besar. Semangko, Selangor. 2,700 feet. 14th May, 1902.

Spread throughout the Indo-Malayan region.

163. Apis indica

Apis indica, *Fabr.*, *Ent. Syst. Suppl.*, 1798, p. 274.
Apis unicolor, *Latr. Ann. Mus. Hist. Nat.* v, 1804, p. 168.
Apis perottetii, *Guér. Icou. Regne. Anim. Ins.*, 1829, p. 461.
Apis nigrocincta, *Smith*, *Journ. Linn. Soc.* v, 1861, p. 93.

Bukit Besar. 31st August, 1901.
Biserat. 20th October, 1901.
Telôm. 19th January, 1902.

As common, or more common, than the last form throughout the Indo-Malayan region.

164. Apis florea

Apis florea, *Fabr.*, *Mant. Ins.* i, 1787, p. 305.

Biserat. 17th August, 1901.
Telôm. 4,000 feet. 19th January, 1902.

'Taken on flowering shrub.'

Not so plentiful as the last two but spread generally through the same region.

MELIPONA, Illiger.

(Trigona)

165. Melipona thoracica

Trigona thoracica, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 50.
Melipona thoracica, *Bingh.*, *Faun. Brit. Ins. Hym.* i, 1897, p. 564, pl. iv, fig. 13, ☿.

Biserat. 15th September, 1901.
Telôm. 4,000 feet. 17th January, 1902.

Described by SMITH, from Malacca. Found also in Tenasserim and the hills of Lower Burma.

166. Melipona canifrons

Trigona canifrons, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 51, ☿.
Melipona canifrons, *Bingh.*, *Faun. Brit. Ind. Hym.* i, 1897, p. 562.

Jeram Kawan, South Perak. February.

Found also in Tenasserim, Borneo, and Sumatra.

167. Melipona nitidiventris

Trigona nitidiventris, *Smith*, *Journ. Linn. Soc.* ii (1857), p. 50, ☿.

Biserat. October, 1901.
Telôm. 4,000 feet. 22nd January, 1902.

Described originally from Malacca. I have seen specimens also from Sumatra.

168. Melipona apicalis

Trigona apicalis, *Smith, Journ. Linn. Soc.* ii (1857), p. 51, ☿.
Melipona apicalis, *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 562, ☿.

Sungkei. February, 1902.

Found also in Burma and Tenasserim, and extending to Borneo.

169. Melipona vidua

Melipona (Trigona) vidua, *Lepel, Hist. Nat. Ins. Hym.* i, 1836, p. 429, ☿.
Melipona vidua, *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 561, ☿.

Biserat.	6th August, 1901.
Semangko, Selangor.	15th May, 1902.
Sungkei	7th February, 1902.

Spread through the Indo-Malayan region.

170. Melipona laeviceps

Trigona laeviceps, *Smith, Journ. Linn. Soc.* ii (1857), p. 51, ☿.
Mellipona, laeviceps, *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 563, ☿.

Biserat, Bukit Besar, Patani, Telôm.

'Nest in house-post in village.'

Common in Tenasserim.

171. Melipona smithii

Trigona ruficornis, *Smith* (*nec Lamarck*), *Trans. Zool. Soc.* vii (1870), p. 194, ☿.
Melipona smithii, *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 563, ☿.

Gedong.

Described from Northern India. Found also in Burma and Tenasserim.

172. Melipona atripes

Trigona atripes, *Smith, Journ. Linn. Soc.* ii (1857), p. 50, ☿.
Melipona atripes, *Dalla. Torre., Cat. Hym.* x, 1896, p. 576 ; *Bingh., Faun. Brit. Ind. Hym.* i, 1897, p. 561, ☿.

Telôm. 3,500 feet. 19th January, 1902.

Described from Malacca ; extends into South Tenasserim.

173. Melipona castanea

(Plate A, figs. 10, 10a, 10b, ♀)

Melipona castanea, *Bingh., Fascic. Malay.*, vol. i, Appendix, p. vi.

Bukit Besar. 1,500-2,500 feet.

'Flying round ripe fruit in jungle.'

174. Melipona basimaculata

(Plate A, figs. 11, 11a, 11b, ♂)

Melipona basimaculata, *Bingh.*, *Fascic. Malay.*, vol. i, Appendix, p. vii.

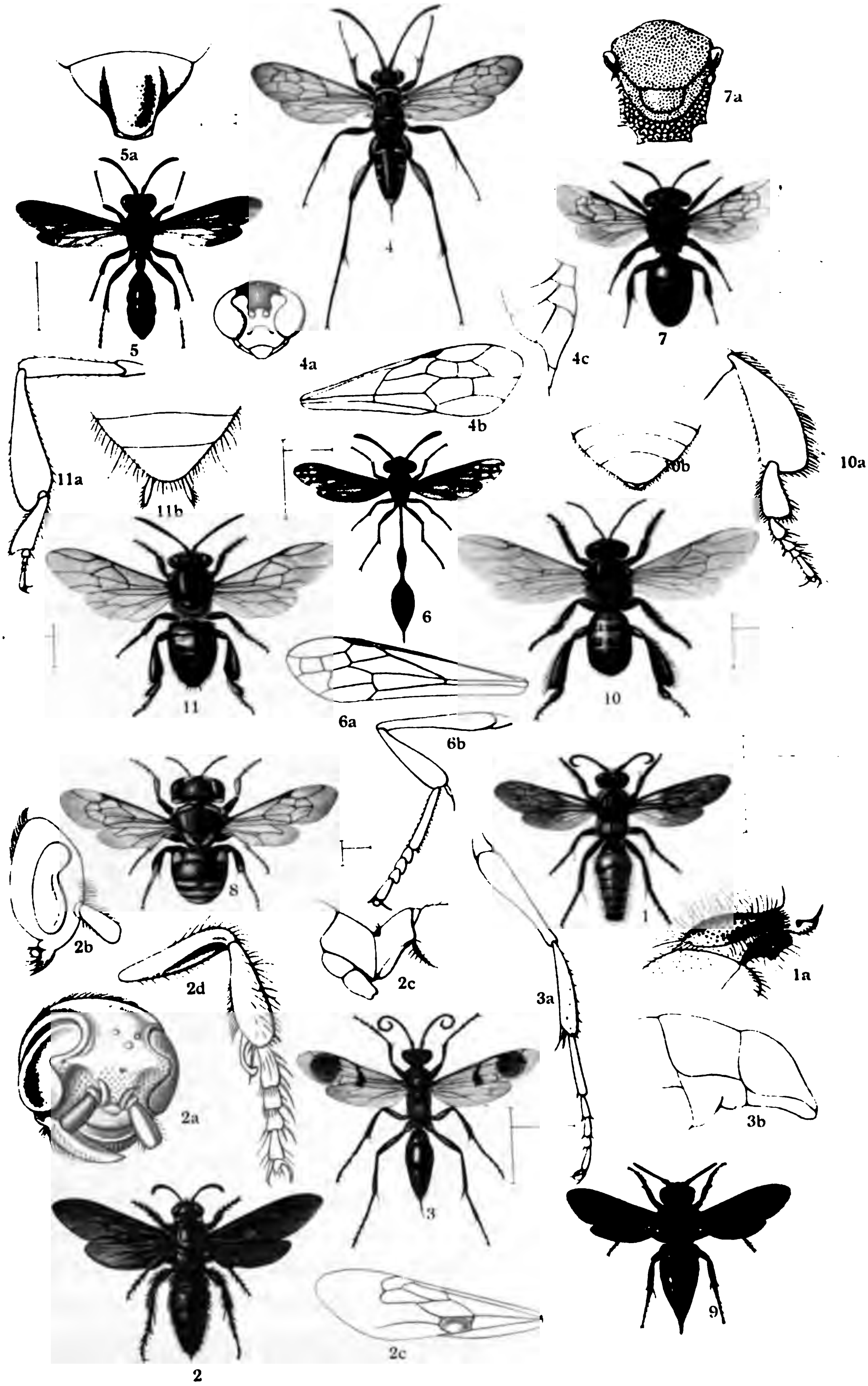
Biserat. Telôm. 15th January, 1902.

'Resting on ceiling at midday.'

This species resembles *M. ventralis* a little, but is very much larger and with different sculpture.

FASCICULI MALAYENSES.

PLATE A.



HENTSCHEL, COLOURTYPE.

HORACE KNIGHT, DEL.

PLATE A

PAGE

FIG. 1. **Mutilla oculata,** Fabr., ♂ ; 1a, basal abdominal segments showing shape of carina on first segment on underside 35

FIG. 2. **Scolia** (*Discolia*) **robinsoni,** Bingh., ♀ ; 2a, head from front showing sculpture ; 2b, same in profile, showing form of vertex ; 2c, venation of forewing ; 2d, armature of foreleg ; 2*e*, basal abdominal segments showing deep ventral construction 38

FIG. 3. **Pseudagenia marpesia,** Bingh., ♀ ; 3a, posterior leg showing armature ; 3b, basal abdominal segments showing ventral groove on second segment 40

FIG. 4. **Ceropales ligea,** Bingh., ♀ ; 4a, head from front showing exserted labrum ; 4b, venation of forewing ; 4c, apical abdominal segment showing exserted sting sheaths 41

FIG. 5. **Cerceris annandali,** Bingh., ♂ ; 5a, apical abdominal segments showing sculpture of pygidial area 47

FIG. 6. **Ischnogaster nitidipennis,** Sauss., ♀ ; 6a, venation of forewing ; 6b, intermediate leg showing single tibial calcar 49

FIG. 7. **Halictus validus,** Bingh., ♀ ; 7a, thorax from above showing sculpture 53

FIG. 8. **Anthidium minutissinum,** Bingh., ♀ 54

FIG. 9. **Celioxys ducalis,** Smith, ♀ 55

FIG. 10. **Melipena castanea,** Bingh., ♀ ; 10a, hind leg ; 10b, apical abdominal segments showing shape in ♀ 59

FIG. 11 **Melipona basimaculata,** Bingh., ♂ ; 11a, hind leg ; 11b, apical abdominal segments showing exserted cerci in ♂ 60

NOTE.—Figs. 2 and 9 are natural size, the rest enlarged ; details much enlarged.

REPORT ON THE BIRDS

BY

W. R. OGILVIE-GRANT

BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, LONDON

INTRODUCTORY NOTE

THE most noteworthy point brought out by the present collection is the complete absence of any of the higher mountain birds from Bukit Besar. That this cannot be due to altitude alone is proved by the fact that the mountain fauna is strongly represented on the Selangor Hills at a height considerably less than that of our encampment on Bukit Besar (2,500 feet).

From Mr. Ogilvie-Grant's paper it is evident that the avifauna of the Patani States is on the whole more Burmese than Malayan, as is shown by the occurrence of *Gecinus viridanus* instead of *G. vittatus* and by the presence of such species as *Coracias affinis* and *Crypsirhina varians.*

The affinities of the high mountain fauna are puzzling, and both Bornean and Sumatran forms seem to be represented, though as might be expected the latter are predominant. The existence of a species of *Chlorura* is interesting as this genus has not hitherto been recorded from continental Asia.

Taking the Peninsula as a whole, three very distinct faunal zones can be recognized which may be called :—

I. The Indo-Burmese zone : occupying the whole of the coastal districts as far south as Penang on the west coast, and extending to the Pahang River on the eastern side of the Peninsula. This zone is coterminous in range with that of *Thereiceryx lineata*, *Parus cinereus*, and, among plants, with *Casuarina equisetifolia.*

II. The Malayan zone : including the remainder of the Peninsula with the exception of the high mountains. The characteristic forms are *Nyctiornis amicta*, *Cymborhynchus macrorhynchus*, *Hemixus cinereus.*

III. The Himalayo-Sundaic zone : covering the mountains of the main range above three thousand feet as far south as Southern Selangor, and also certain of the loftier isolated massifs. The characteristic forms are *Rhinocichla mitrata*, *Sibia simillima*, etc.

Speaking generally there seems but little more to do on the western side of the Peninsula, even in the mountains, as assiduous collecting for the last year has only resulted in the discovery of one new species and the addition of some five or six others to the list of birds found in the Peninsula.

Gunong Tahan in Pahang may, however, be expected to yield a considerable number of novelties, while it is highly important that the lofty mountains north of Senggora on the east coast, which are as yet absolutely virgin ground, should be thoroughly explored in order to ascertain whether the fauna occurring on Mooleyit in Tenasserin extends so far south.

In the present paper my own notes are distinguished by being enclosed within inverted commas.

HERBERT C. ROBINSON

SELANGOR STATE MUSEUM
KUALA LUMPUR
24*th* *November*, 1904

REPORT ON THE BIRDS

By W. R. OGILVIE-GRANT
BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, LONDON

DURING their recent expedition to the Siamese Malay States and Perak Messrs. H. C. Robinson and Nelson Annandale made a large collection of birds, which they have kindly placed in my hands for identification. Below will be found a complete list with notes. One species of Bulbul (*Pycnonotus robinsoni*) appears to be new. A female Green Weaver-finch of the genus *Chlorura* may likewise represent a distinct form near *C. borneensis*, but until the arrival of male examples I have refrained from naming it. The first set of this fine collection has been presented to the British Museum, the remaining specimens being given to the Royal Scottish Museum, Edinburgh. To save repetition, Mr. J. L. Bonhote's report 'On the Birds collected during the Skeat Expedition to the Malay Peninsula' (*P.Z.S.*, 1901, pp. 57-81) is quoted as 'Bonhote.' Mr. E. Hartert's article 'On Birds from Pahang, Eastern Malay Peninsula' (*Nov. Zool.* ix, pp. 537-580 (1902)) is quoted as 'Hartert.'

CORVIDAE

1. **Cervus enca,** Horsf.

Corone enca, *Sharpe*, *Cat. B. Brit. Mus.* iii, p. 43 (1877).

♂ ad. Jeram Kawan, South Perak. 13th February. (No. 663)

The Slender-billed Crow has the iris brown, and the bill and feet black. The Museum possesses only two examples from the Malay Peninsula, procured respectively at Johore and Malacca.

'The above locality is situated in deep jungle many miles from any considerable extent of open country, and I find that the individual secured is recorded in my journal as having a much more subdued and less raucous "caw" than the succeeding species.'

'Malay name, *Gagak hutan*.'

2. **Cervus macrorhynchus**, Wagl.

Corone macrorhyncha, *Sharpe*, *Cat. B. Brit. Mus.* iii, p. 38 (1877).

♂ ad.	Ban Sai Kau, Nawngchik.	26th April.	(No. 15)
♂ ad.	Bayu, Jalor.	9th July.	(No. 260)
♂ ad.	Jambu, Jhering.	9th June.	(No. 167)

The Jungle-Crow has the iris brown and the bill and feet black.

'In the Malay Peninsula at least, the trivial name of this species is somewhat misleading as it is rarely, if ever found far from open country. In Patani and other east coast districts, it is very abundant, roosting and nesting in the crowns of cocoa-nut and sugar palms, but in the Federated Malay States it is comparatively scarce. In Patani, on an easily understood homoeopathic principle, the ashes of a crow's wing-feathers are in great demand as a specific against grey hair, whilst in South Perak, oil in which the feathers have been boiled is used for a similar purpose. Malay name, *Gagak kampong*.'

3. **Platysmurus leucopterus**, (Temm.)

Platysmurus leucopterus, *Bonhote*, p. 59.

♂ ad.	Sungkei, South Perak.	8th February.	(No. 621)

The White-winged Jay has the iris red and the bill and legs black.

'Apparently rare; the above individual was shot in deep jungle. Malay name, *Gembala gajah* (Elephant herd).'

4. **Crypsirhina varians**, (Lath.)

Crypsirhina varians, *Sharpe*, *Cat. B. Brit. Mus.* iii, p. 83 (1877).

♂, ♀ ad.	Patani.	30th May and 18th and 19th June.	(Nos. 140, 198, 199)

The Racket-tailed Magpie has the iris red and the bill and feet black.

'Only met with in Patani, where it was not uncommon during May and June, generally frequenting the Cashew trees in search of cockchafers and big green Rutelid beetles (*Anomala viridis*). The species has not been previously recorded from the Malay Peninsula, and is apparently unknown on the west coast or further south than Patani.'

EULABETIDAE

5. **Eulabes javanensis**, (Osbeck)

Mainatus javanensis, *Bonhote*, p. 66.

Gracula javanus (Cuv.), *Hartert*, p. 579.

♀ ad.	Ban Sai Kau, Nawngchik.	22nd May.	(No. 123)
♂, ♀ ad.	Biserat, Jalor.	June, July.	(Nos. 209, 210, 271)
♂ ad.	Mabek, Jalor.	27th July	(No. 325)

In the Malay Grackle the iris is brown, the wattles orange, paler at the base, the bill orange-lemon, yellow at tip, and the feet bright yellow.

'The *Tiong gajah* or *Tiong mas*, as the Malays call this species, is very common in the Patani States, frequenting open forest and orchard-land, but it is not found in the coast-districts, and is much rarer on the western side of the Peninsula. It is a favourite cage-bird among the natives, and large sums are paid for clever talkers.'

6. **Calornis chalybeus,** (Horsf.)

Calornis chalybea, *Bonhote*, p. 66.

♂ ad.	Patani.	30th May.	(No. 144)
♂, ♀ ad. et ♀ imm.	Ban Sai Kau, Nawngchik.	April, May.	(Nos. 16, 107, 114)
♂, ♀ ad.	Biserat, Jalor.	5th and 16th July.	(Nos. 242, 283)
♂ imm.	Bidor, South Perak.	2nd and 3rd Feb.	(Nos. 607, 610, 612)

The Glossy Calornis has the iris carmine and the bill and feet black.

'Common everywhere in open country, nesting in the Pinang palms, or occasionally at the top of dead trees. Malay name, *Perling*.'

7. **Aethiopsar fuscus,** (Wagl.)

Acridotheres fuscus, *Bonhote*, p. 66.

♂ ad.	Ban Sai Kau.	21st May.	(No. 121)
♀ juv.	Biserat, Jalor.	7th and 13th July.	(Nos. 253, 275)

The Jungle-Myna has the iris deep yellow (white, tinged with yellow in the young), the bill orange with the basal portion of the lower mandible black feet yellow, claws paler.

'Very common in the rice-fields; nearly always in close attendance on the buffaloes and oxen, so much so that it is often difficult to shoot specimens. Malay name, *Burong gembala kerbau* (Buffalo-herd).'

DICRURIDAE

8. **Chaptia aenea,** (Vieill.)

Chaptia aenea, *Sharpe*, *Cat. B. Brit. Mus.* iii, p. 243 (1877).

♂, ♀ ad.	Telôm, Perak-Pahang border.	24th January.	(Nos. 581, 582)

The Bronzed Drongo has the iris red and the bill and feet black.

'Very common on the edge of high bamboo jungles in the hill country, perching on the extreme tips of the higher shoots. The species is probably semi-crepuscular in its habits, as it rarely appeared before 5 p.m., when it was to be seen hawking insects (chiefly winged termites) and performing wonderful aerial summersaults. The note is a clear melodious whistle, twice repeated with a brief interval between. In Patani species of *Dicruridae* are known as *Anak damak* or *Hamba kĕra* (Monkey's slave), while in South Perak and Selangor *Chawi-chawi* is the commoner name.'

9. **Bhringa remifer,** (Temm.)

Bhringa remifer, *Sharpe*, *P.Z.S.*, 1887, p. 434 ; *Bonhote*, p. 59 ; *Hartert*, p. 580.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. 19th and 20th January. (Nos. 551, 556, 559)

Five examples from Perak differ constantly from the large series of *Bhringa* from North India, etc., in having the web on the terminal part of the lengthened outer tail-feathers much narrower, 0·5 inch or less in width. The racket-shaped end is greatly lengthened, and extends much further down the shaft, tapering off gradually towards the base, instead of terminating abruptly. Birds from Sumatra and Java appear to share this peculiarity, but the Museum series is very deficient in examples with complete tails. The name *Edolius remifer* was given by TEMMINCK to birds from Java and Sumatra, and should no doubt include the birds from Perak ; the northern examples standing as *B. tectirostris*, HODGS.

'In habits similar to the preceding.'

10. **Dissemurus paradiseus** (Linn.)

Dissemurus paradiseus, *Bonhote*, p. 59.
Dissemurus paradiseus paradiseus, *Hartert*, pp. 579 and 580.

♂ ad.	Nawngchick.	28th November.	(No. 484)
♂, ♀ ad.	Biserat, Jalor.	14th July.	(Nos. 277, 286)
♀ ad. et imm.	Mabek, Jalor.	22nd and 23rd July.	(Nos. 302, 307, 308)
♀ imm.	K. Datoh, Tanjong Patani.	3rd October.	(No. 408)
♂, ♀ ad.	Sungkei, South Perak.	8th and 10th February.	(Nos. 620, 622, 645)
♂ ad.	Batang Padang, South Perak.	29th January.	(No. 604)

The Larger Racket-tailed Drongo has the iris chestnut or red and the bill and feet black.

'Widely distributed from the sea-coast to the thick central jungles, but not ascending the hills to any considerable elevation.'

ORIOLIDAE

11. **Oriolus consanguineus,** Wardlaw-Ramsay.

Oriolus consanguineus, *Sharpe*, *P.Z.S.*, 1887, p. 434 ; *Bonhote*, p. 59.

♂ ad. Telôm, Perak-Pahang border. 19th January (No. 548)

The Crimson-breasted Oriole has the iris chestnut and the bill and feet pale bluish-horn. Specimens from the Malay Peninsula appear to be somewhat larger than those from Sumatra, males from the former locality having the wing 5·4 inches, while those from the latter measure 5·1-5·2 inches. We may here remark that *O. vulneratus*, Sharpe, from Borneo, appears to be indistinguishable from the present species, the supposed differences found in the gloss of the upper parts and the amount of red on the primary-coverts being apparently of no importance (cf. *Ibis*, 1887, p. 438).

'This bird frequents dark and narrow gullies overgrown with the thickest vegetation, and is shy and retiring in its habits. Its lower limit is about three thousand feet, and it is by no means a rare bird to those acquainted with its habits.'

PLOCEIDAE

12. Munia maja, (Linn.)

Munia maja, *Bonhote*, p. 67.

♀ imm.	Patani.	30th May.	(No. 143)
♀ ad.	Ban Sai Kau.	20th December.	
♂ ad.	Biserat.	18th July.	(No. 288)

This White-headed Munia has the iris brown, the bill lead-blue, and the feet greyish-black.

'Common on the rice-fields and on waste ground; a favourite cage bird with Malays. Malay name, *Burong pipit*; *Burong laki padi* (husband of the rice).'

13. Munia acuticauda, Hodgs.

Munia acuticauda, *Hartert*, p. 579.

♂ ad. Ban Sai Kau, Nawngchik. 26th April. (No. 10)

Hodgson's Munia has the iris rich sienna-brown, the bill bluish lead-colour, black along the culmen, and the feet greyish-black.

'Not so common as the preceding species and found as a rule in low brushwood overgrown with lalang grass.'

14. Ploceus atrigula, Hodgs.

Ploceus atrigula, *Bonhote*, p. 67.
Ploceus passerinus infortunatus, *Hartert*, p. 577.

♀ ad.	Ban Sai Kau.	24th May.	(No. 131)
♂ ad.	Biserat, Jalor.	1st July.	(No. 223)

These birds, with the wing 2·75 inch, belong to the slightly smaller race which has been named *P. passerinus infortunatus*, Hartert.

In the birds from India the wing measures 2·9–3·0 inches. ♂ iris brown, bill black, a yellow bar across the base of the lower mandible, feet flesh colour. ♀ iris brown, bill yellowish-horn, feet pinkish.

'Common in the environs of almost every village. The peculiar "abortive nests" or swings made by the male, and weighted with lumps of mud, are well known, and a source of wonder to the Malays, who are extraordinarily observant in matters zoological.'

15. Chlorura, sp.

♀. Telôm, Perak-Pahang border. 22nd January. (No. 570)

The adult female *Chlorura*, collected by Mr. Robinson at Telôm, is very closely allied to *C. intermedia*, Hartert, from Lombock and Flores, having the same dark tawny rufous lores, but the chest and breast are somewhat paler, and in this respect the Malay bird closely resembles *C. borneensis*.

The iris is brown, the bill black, and the feet yellowish-brown.

'Only one specimen of this bird was seen, creeping about among low bamboos, very much after the manner of a Titmouse.'

FRINGILLIDAE

16. Emberiza aureola, Pall.

Emberiza aureola, *Sharpe, Cat. B. Brit. Mus.* xii, p. 509 (1888).

ad. et imm. Nawngchik. November.

'The Yellow-breasted Bunting was evidently on migration, at the commencement of the heavy rains.'

17. Passer montanus, Linn.

Passer montanus, *Sharpe, Cat. B. Brit. Mus.* xii, p. 301 (1888).

♀ ad. Ban Sai Kau. 14th September. (No. 386)
♀ ad. Anak Bukit. 25th April. (No. 9)

The Tree-Sparrow has the iris brown, the bill black, and the feet flesh-colour.

'In towns and near the coast as common as the English sparrow at home, but rarely seen in up-country villages.'

MOTACILLIDAE

18. Anthus rufulus, Vieill.

Anthus rufulus, *Bonhote*, p. 66.
Anthus rufulus malayensis, *Eyton*, *Hartert*, p. 575.

♂, ♀ ad.	Kampong Jalor.	29th October, 5th November.	(Nos. 457, 469)
♀ ad.	Bayu, Jalor.	9th July.	(No. 261)
♀ ad.	Biserat, Jalor.	18th July.	(No. 287)

The specimens before us belong to the form of the Indian Pipit known as *A. malayensis*, Eyton, having the outer web of the penultimate tail-feathers black almost to the tip, edged externally with white.

'Almost the most characteristic bird of open country and dry rice-fields. No. 287 was snared on its nest which was situated among long grass at the edge of a rice-field, and consisted of a flat circular pad some five inches in diameter, composed of dead grass and loose maize leaves, lined with a few horse-hairs, which must have been hard to come by as there were only three ponies in the country. The eggs were four in number, rather pointed, the ground colour dirty white, thickly covered with very fine dark sienna-brown mottlings, evenly distributed, and also with large purplish-black blotches more thickly congregated at the larger end. Malay name, *Apit-apit*.'

19. Motacilla borealis, (Sund.)

Motacilla borealis, *Sharpe*, *Cat. B. Brit. Mus.* x, p. 552 (1885).

♀ ad.	Patani Town.	20th April.	(No. 1)
♀ imm.	Nawngchik.	27th November.	(No. 481)
♂, ♀ ad.	Ban Sai Kau.	16th September.	(Nos. 389, 390)

The Grey-headed Wagtail has the iris black, the bill black, paler at the base, and the feet black, with the soles yellowish.

'Common in open country from September to April.'

20. Motacilla melanope, Pall.

Motacilla melanope, *Sharpe*, *P.Z.S.*, 1887, p. 441.
Motacilla boarula melanope, *Hartert*, p. 575.

♀ ad.	Jeram Kawan, South Perak.	16th February.	(No. 677)
♂ ad. et imm.	Sungkei, South Perak.	7th February.	(Nos. 617, 652)

The Grey Wagtail has the iris dark brown, bill black, feet brownish-flesh.

NECTARINIIDAE

21. **Arachnothera modesta,** (Eyton.)

Arachnothera affinis modesta, *Hartert*, p. 574.

♀ ad. et imm. Bukit Besar, Nawngchik. 2,500 feet. May. (Nos. 30, 54, 364)
♂ ad. Jeram Kawan, South Perak. 15th February. (No. 669)

The Grey-breasted Spider-hunter has the iris hazel, the bill blackish, yellowish horn-colour below, and the feet flesh.

'The habits of all the species of Spider-hunters are very similar. On Bukit Besar, where they are very abundant, they chiefly frequented the wild banana and tall zingiberaceous plants that covered the clearing in which we were encamped. They run along the underside of these broad leaves with great rapidity, displaying a singular fearlessness. Their food in part at least consists of vegetable matter, and they are particularly fond of the purple seeds of a shrubby plant probably belonging to the *Sterculiaceae*.'

22. **Arachnothera robusta,** (Mull. and Schl.)

Arachnothera robusta, *Hartert*, p. 574.

♀ (♂) ad. Kulu Bidor, South Perak. 21st February. (No. 679)

The example of the Stout-billed Spider-hunter is certainly a female, and lacks the ornamental chest-plumes characteristic of the male.

Iris dark brown, bill and feet black.

23. **Arachnothera longirostris,** (Lath.)

Arachnothera longirostris, *Sharpe*, *P.Z.S.*, 1887, p. 441.
Arachnothera longirostra, *Hartert*, p. 574.

♀ ad. Ban Sai Kau. 3,000 feet. 23rd May.

In the Little Spider-hunter the iris is light brown, the bill black, greyish at the base of the lower mandible, and the feet black.

24. **Arachnothera chrysogenys,** (Temm.)

Arachnothera chrysogenys, *Gadow*, *Cat. B. Brit. Mus.* ix, p. 108 (1884).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. 3rd and 4th May. (Nos. 45, 52, 57)

The Yellow-eared Spider-hunter has the iris brown, the bill black, the gape and tomia yellow, and the feet yellowish-grey.

25. **Arachnothera magna,** Hodgs.

Arachnothera magna, *Sharpe*, *P.Z.S.*, 1887, p. 441.

♀ ad. Semangko Pass, Selangor-Pahang border. 2,700 feet. 16th May and November.

The Large Spider-hunter has the iris dark brown, the bill black, the tomia dull yellow, and the feet bright gamboge.

'Very abundant on a flowering bamboo in company with *Aethopyga wrayi*.'

26. **Arachnothera crassirostris,** (Reichenb.)

Arachnothera crassirostris, *Bonhote*, p. 64.

♂ ad. Gedong, South Perak. 7th January. (No. 499)

The Thick-billed Spider-hunter has the iris hazel, the bill black, horn-coloured at base, and the feet flesh-coloured with the soles orange.

27. **Anthothreptes hypogrammica,** (S. Müll.)

Anthreptes hypogrammica, *Hartert*, p. 574.

♂ ad. Bukit Besar, Nawngchik. 2nd May. (No. 24)

The Blue-naped Sun-bird has the iris brown, the bill black, and the feet olive-brown, yellow on the soles.

'It was met with on a flowering tree in the early morning.

'Apparently a strictly jungle species and evidently rare, as only a single specimen was collected or even seen.'

28. **Anthothreptes malaccensis,** (Scop.

Anthothreptes malaccensis, *Bonhote*, p. 65.
Anthreptes malaccensis, *Hartert*, p. 573.

♂ imm.	Patani.	19th June.	
♂, ♀ ad.	Ban Sai Kau.	25th May.	
♂ imm.	Jambu, Jhering.	5th and 6th June.	(Nos. 150, 158)
♂, ♀ ad.	Sungkei, South Perak.	7th and 9th February.	(Nos. 625, 634)

The Brown-throated Sun-bird was feeding on the inflorescence of the cocoa-nut palms.

The iris is chestnut or brown, the bill black in the male, with the tip and base of the lower mandible bluish in the female, the legs greenish, and the soles orange.

'The commonest of the Sun-birds throughout the Peninsula, and found in every garden and native village, but not in jungle. In these localities it feeds, as noted above, on the cocoa-nut palms and on the flowers of Hibiscus, but among the Casuarinas on the sea coast it is often found in great numbers, and in this case is probably attracted by small insects found on the cones and in the crevices of the bark. Malay name, *Burong blacham.*'

29. Aethopyga wrayi, Sharpe

Aethopyga wrayi, *Sharpe, P.Z.S.*, 1887, p. 440, pl. xxxviii, fig. 2, 1888, p. 277 ; *Hartert*, p. 573.

♂ ad. Gunong Berumban, Perak. 5,000 feet. 28th January. (No. 602)

A male of Wray's Sun-bird.

'Very common at times among low shrubs and bamboos at high elevations, but very difficult to secure uninjured, chiefly owing to its extraordinary tameness and curiosity.'

DICAEIDAE

30. Prionochilus ignicapillus, Eyton.

Prionochilus ignicapillus, *Sharpe, P.Z.S.*, 1888, p. 277.

♂ vix ad. Bukit Besar, Nawngchik. 2,500 feet. 10th May. (No. 87)

The Crimson-breasted Flower-pecker has the iris reddish-brown, the bill black, and the feet lead-colour. In the present instance the green-edged primaries characteristic of immaturity are still retained.

'It frequents the tops of the high trees in flocks of five or six individuals.'

31. Dicaeum cruentatum, (Linn.)

Dicaeum cruentatum, *Bonhote*, p. 65.

♂ ad.	Patani.	14th June and 10th October.	(Nos. 187, 443)
♂ ad.	Nawngchik.	27th November.	(No. 480)
♂ ad.	Gedong, South Perak.	8th January.	(No. 505)

The Scarlet-backed Flower-pecker has the iris brown and the bill and feet black.

'An open-country and coastal form ; very abundant at Patani among the Cashews. Known to the Malays in old-folk tales ; it is an important figure as the *Burong supa Patri* (Princess-bird).'

32. Dicaeum trigonostigma, (Scop.)

Dicaeum trigonostigma, *Bonhote*, p. 65 ; *Hartert*, p. 575.

♂ ad. Biserat, Jalor. 12th June. (No. 269)
♂, ♀ ad. Jeram Kawan, South Perak. 13th February. (Nos. 656, 660, 661)

The Orange-bellied Flower-pecker has the iris black, the bill black, and the feet lead-colour.

33. Dicaeum ignipectus, (Hodgs.)

Dicaeum ignipectus, *Sharpe*, *P.Z.S.*, 1887, p. 441 ; *Bonhote*, p. 65 ; *Hartert*, p. 575.

♂ (♀) ad. Telôm, Perak-Pahang border. 4,000 feet. 21st January. (No. 561)

The example of the Fire-breasted Flower-pecker, undoubtedly a male, resembles typical *D. ignipectus* in plumage, and has the flanks of quite the same colour, but the bill is strikingly longer and stronger.

The iris is dark brown, and the bill and feet lead-colour.

'A high mountain form on the Malay Peninsula. I am inclined to think that there has been some mistake in the locality of the specimens recorded by Mr. BONHOTE (*loc. cit.*)'

ZOSTEROPIDAE

34. Zosterops aureiventer, Hume.

Zosterops auriventer, *Sharpe*, *P.Z.S.*, p. 441 ; *Hartert*, p. 575.

♀ ad. Bukit Besar, Nawngchik. 2nd September. (No. 373).

Hume's White-eye has the iris brown, the bill lead-blue, black along the culmen and at the tip, and the feet lead-blue.

'Only seen on one day, when it suddenly appeared in considerable numbers after a very stormy night.'

35. Zosterops palpebrosa, (Temm.)

Zosterops palpebrosa, *Sharpe*, *Cat. B. Brit. Mus.* ix, p. 165 (1884).

♂, ♀ ad. Tanjong Patani. 28th and 30th September. (Nos. 410, 411, 412)

The birds collected at Patani appear to be typical examples of the Indian White-eye (*Z. palpebrosa*), and are easily distinguished from the Chinese *Z. simplex*, SWINH.

The iris is greyish-hazel, the bill black, lead-coloured at the base, and the feet lead-coloured.

'Found only among the Casuarinas on Cape Patani, where they were very abundant, though none were present during May and June; equally common in similar situations in Selangor, nesting among the mangroves only a few inches above high-tide level.'

SITTIDAE

36. Dendrophila azurea, (Less.)

Sitta Azurea, *Sharpe*, *P.Z.S.*, 1887, p. 441; *Hartert*, p. 573.

Ad. Semangko Pass, Selangor-Pahang border. 4,000 feet. 9th May. (No. 1)

The Azure Nuthatch has the iris white, the obital skin livid bluish-white, and the bill and feet livid bluish-horn.

'A mountain form: abundant in the above locality.'

37. Dendrophila saturatior, Hartert

Sitta frontalis saturatior, *Hartert*, p. 573.

♀ ad. et imm. Bukit Besar, Nawngchik. May and August. (Nos. 93, 94, 366)

I have provisionally employed Mr. HARTERT's name for the violet-breasted form of the blue Nuthatch found in the Malay Peninsula, though I am by no means satisfied that it is really distinct from *D. oenochlamys* (*lilacea*) from the Philippines.

Mr. H. C. ROBINSON collected two adult females with the breast washed with violet, and a younger specimen in which these parts are greyish-rufous and entirely devoid of violet.

Iris brown or lemon-yellow, bill coral-red, feet brownish-black.

'Usually a jungle-species; one specimen, however, was shot in an orchard at Biserat, but was too much damaged to preserve.'

PARIDAE

38. Melanochlora sultanea, (Hodgs.)

Melanochlora sultanea, *Sharpe*, *P.Z.S.*, 1888, p. 277.

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. February, May, and August.
(Nos. 25, 28, 65, 66, 68, 360)

A male of the Sultan-bird has the iris dark brown, the bill black, and the feet greenish-grey.

'This bird was often noted in flocks of seven or eight individuals feeding along the edge of our clearing in Bukit Besar. In flight and actions it does not in the least resemble a Titmouse, but reminds one more of the Bulbuls.'

39. **Parus atriceps,** Horsf.

Parus atriceps, *Oates, Faun. Brit. Ind., Birds* i, p. 46 (1889).
Parus cinereus, *Vieill., Gadow., B. Brit. Mus.* viii, p. 16, (1883).

♂ ad.	Patani.	June, September.	(Nos. 420, 422)
♂, ♀ ad.	Jambu, Jhering.	June.	(Nos. 149, 160, 161)

The Indian Grey Titmouse has the iris brown or hazel, the bill black, and the feet greenish-grey or greenish-blue.

'Another of the species which, in the Malay Peninsula, appears to be strictly confined to the belt of Casuarinas skirting the coast in certain districts.'

PRIONOPIDAE

40. **Platylophus ardesiacus,** (Cab.)

Platylophus ardesiacus, *Sharpe, Cat. B. Brit. Mus.* iii, p. 317 (1877)

♂ ad.	Sungkei, South Perak.	7th February.	(No. 614)

The Jay-Shrike has the iris Indian red, and the bill and feet black.

The specimen is in freshly moulted plumage and has the upper parts very dark and the under parts washed with grey.

LANIIDAE

41. **Lanius tigrinus,** Drap.

Lanius tigrinus, *Grant, Nov. Zool.* ix, p. 480 (1902) ; *Hartert,* p. 576.

♀ imm.	Jeram Kawan, South Perak.	13th February.	(No. 659)

The young of the Thick-billed Shrike has the iris hazel, the bill black, pinkish at the base, and the feet bluish-grey.

42. **Lanius cristatus,** Linn.

Lanius cristatus, *Gadow., Cat. B. Brit. Mus.* viii, p. 271 (1883) ; *Grant, Nov. Zool.* ix, p. 481 (1902)

♀ ad. et imm.	Anak Bukit, Nawngchik.	24th April.	(No. 7)

A female of the Brown Shrike has the iris black, the bill lead-colour, paler at the base and black at the tip, and the feet black.

SYLVIIDAE

43. **Orthotomus atrigularis,** Temm.

Orthotomus atrigularis, *Sharpe, Cat. B. Brit. Mus.* vii, p. 220 (1883).

♀ ad.	Cape Patani.	10th June.	(No. 169)
♀ imm.	Bukit Besar, Nawngchik.	10th May.	(No. 83)
♀ ad.	Gedong, South Perak.	8th January.	(No. 504)

Two adult females of the Black-necked Tailor-bird have the iris brown or pale yellow, the upper mandible black, the lower yellowish-horn, and the feet yellowish-flesh.

'A coastal and scrub-country form; never apparently found in old jungle.'

44. **Phylloscopus borealis,** (Blas.)

Phylloscopus borealis, *Seebohm*, *Cat. B. Brit. Mus.* v, p. 40 (1881).

♂ imm. Patani. 2nd October. (No. 433)

The Arctic Willow-warbler has the iris hazel, the bill black above, yellowish beneath, and the feet yellowish-brown.

'Evidently on migration, large flocks appearing on the breaking of the monsoon.'

TURDIDAE

45. **Turdus obscurus,** Gmel.

Merula obscurus, *Seebohm*, *Cat. B. Brit. Mus.* v. p. 273 (1881).

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 24th January. (No. 583)

The Dark Ouzel has the iris pale hazel, the bill black above, yellow below, and the feet pale yellow.

'Only this individual was seen; it was so busily engaged in wrestling with a large and hairy caterpillar that I had time to send for a twelve-bore gun, the only one available, extract most of the shot from the cartridge, and shoot the bird within a distance of about ten yards from the ladder of our hut on which I was sitting.'

46. **Geocichla davisoni,** Hume.

Geocichla davisoni, *Sharpe*, *in Seebohm's Monogr. Turdidoe*, i, p. 101, pl. xxi, (1898).

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 22nd January. (No. 659)

In DAVISON's Ground-Thrush the iris is dark brown, the bill black, and the feet dull yellow.

'Another specimen was secured by Mr. L. WRAY in the Larut Hills, also in the winter months.'

47. Cittocincla tricolor, (Vieill.)

Kittacincla macrurus tricolor, *Hartert*, p. 572.

♂ ad.	Bukit Besar, Nawngchik.	2,500 feet.	9th May.	(No. 74)
♀ (♂) ad.	Biserat, Jalor.		15th July.	(No. 285)
♀ (♂) ad.	Gedong, South Perak.		9th January.	(No. 510)

The three specimens of the Shama are all in fully adult male plumage; of these two are no doubt incorrectly marked as female. The birds obtained at the two first named localities in Patani have long tails measuring respectively 7·0 and 7·3 inches, and the breast and underparts lighter chestnut. The third specimen from Perak has a shorter tail, measuring 6 inches, and the breast and underparts deeper chestnut. All intermediate stages are represented in the British Museum collection.

'The Shama is found distributed throughout the Peninsula, but does not appear to ascend the hills much above three thousand feet, or to occur among the mangroves of the tidal estuaries. It mainly affects secondary jungle, but is often found in the middle of comparatively large towns. Malay name, *Murai rimba*, or *Murai batu*.'

48. Copsychus musicus, (Raffl.)

Copsychus musicus, *Sharpe*, *P.Z.S.*, 1888, p. 436.
Copsychus saularis musicus, *Hartert*, p. 571.
Copsychus saularis (Linn.), *Bonhote*, p. 63.

♂, ♀ ad.	Ban Sai Kau, Nawngchik.	May.	(Nos. 125, 126)
♀ ad.	Biserat, Jalor.	July.	(No. 265)
♂ ad.	Patani.	May, June.	(Nos. 142, 165)
♂ ad.	Sungkei, South Perak.	2nd February.	(No. 616)

The Magpie-Robin has the iris hazel or brown, and the bill and feet black.

'Quite the commonest bird in the Peninsula in towns and villages, extending along the roads to an altitude of about three thousand feet, but never found in jungle.'

49. Henicurus schistaceus, Hodgs.

Enicurus schistaceus, *Hartert*, p. 570.

♂ ad.	Sempan, Selangor-Pahang border.	4,200 feet.	10th May.

A male of the Slaty-backed Forktail in very worn plumage, has the iris black, bill black, and the feet yellowish flesh-colour.

'Several pairs of this species were seen in the bed of a rocky stream. Their habits are very similar to those of the Wagtails; and the note, which is constantly uttered, is a very high-pitched whistle, almost a scream.'

TIMELIIDAE

50. **Mesia argentauris,** Hodgs.

Mesia argentauris, *Sharpe*, *P.Z.S.*, 1886, p. 352; 1888, p. 276; *Hartert*, p. 568.

♂, ♀ ad. Telôm, Perak-Pahang border. 4,000 feet. 26th, 27th January. (Nos. 500, 505, 563, 596)

The Silver-eared Mesia has the iris dark brown, the bill pale orange, and the feet wax-yellow.

'Common above three thousand feet; usually found in pairs hunting for food among the dead branches of fallen trees.'

51. **Cutia cervinicrissa,** Sharpe.

Cutia cervinicrissa, *Sharpe*, *P.Z.S.*, 1888, p. 276.

♀ ad. Semangko Pass, Selangor-Pahang border. 4,000 feet.

A female of the Malayan Cutia agrees well with typical examples collected by Mr. L. Wray, and has the iris brown, the bill slate, and the feet chrome.

'Common in the above locality in small flocks of five or six individuals, climbing among the branches of low trees and searching for insects very much in the manner of a Titmouse.'

52. **Herpornis xantholeuca,** Hodgs.

Herpornis xantholeuca, *Sharpe*, *P.Z.S.*, 1888, p. 275.
Erpornis xantholeuca, *Hartert*, p. 568.

♀ ad. Bukit Besar, Nawngchik. 24th August. (No. 342)

The White-bellied Herpornis has the iris brown, the bill fleshy-horn, and the feet pinkish-flesh.

53. **Siva sordidior,** Sharpe.

Siva sordida, *Sharpe* (*nec Hume*), *P.Z.S.*, 1887, p. 438.
Siva sordidior, *Sharpe*, *P.Z.S.*, 1888, p. 276.

♂, ♀ ad. Telôm, Perak-Pahang border. 4,000 feet. January. (Nos. 571, 589, 598)

The Perak Siva has the iris hazel, the bill pinkish-horn, and the feet brownish.

'Found in pairs, associating with *Alcippe peracensis*.'

54. Sibia simillima, Salvad.

Sibia simillima, *Sharpe*, *P.Z.S.*, 1886, p. 352 ; 1888, p. 274 ; *Bonhote*, p. 63.
Sibia picaoides simillima, *Hartert*, p. 567.

♂, ♀ ad. Telôm, Perak-Pahang border. 18th to 27th January.
(Nos. 546, 549, 550, 591, 594)

The Long-tailed Sibia has the iris reddish- or hazel-brown, and the bill and feet black.

'Very common at Telôm in flocks of four or five ; contrary to the habits of most of the hill birds, it usually keeps fairly high up in the trees, and is one of the most conspicuous and easily obtained species.'

55. Mixornis gularis, (Raffl.)

Mixornis gularis, *Sharpe*, *P.Z.S.*, 1888, p. 275; *Bonhote*, p. 64; *Hartert*, p. 567.

♂ ad.	Bukit Besar, Nawngchik.	2,500 feet.	2nd September.	(No. 375)
♂ ad.	Ban Sai Kau.		22nd May.	
♂ ad.	Gedong, South Perak.		8th January.	(No. 503)
♂ ad.	Jeram Kawan, South Perak.		14th February.	(No. 666)

The Sumatran Yellow-breasted Babbler has the iris brown, the loral-space lead-blue, the bill bluish lead-colour, the feet greenish-brown, and the toes yellow. The black shaft streaks on the feathers of the throat seem to be widest in examples from the southern parts of its range, being most strongly marked in birds from the southern part of the Malay Peninsula and Sumatra.

56. Stachyrhidopsis chrysaea, (Hodgs.)

Cyanoderma chrysaea, *Sharpe*, *P.Z.S.*, 1887, p. 440.
Stachyridopsis chrysaea assimilis, *Hartert*, p. 566.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500 feet. January. (Nos. 538, 552, 580)

The Golden-headed Babbler has the iris dark sienna, the bill dark lead-colour, paler on tomia and pinkish at the base of the lower mandible, and the feet flesh-colour, inclining to yellowish behind.

In spite of Mr. HARTERT's statement to the contrary (cf. *Nov. Zool.* ix, p. 566 (1902), I think Dr. SHARPE was perfectly justified in referring the Perak bird, collected by Mr. L. WRAY, to this form rather than to *S. assimilis*. The three specimens now before us agree perfectly with other birds from Perak, and are in my opinion inseparable from typical *S. chrysaea*, differing from *S. assimilis* in the colour of the back and underparts which are much brighter yellow. The range of *S. assimilis* appears to be limited to northern

Tenasserim and Karenee. Should the Malaccan bird be regarded as distinct from *S. chrysaea*, it must bear the name of *S. bocagei*, Salvad., founded on examples from Sumatra (cf. *Ann. Mus. Civ. Gen.* (1) xiv, p. 223 (1879)).

'Very abundant among the undergrowth, and so extraordinarily tame and inquisitive that it was difficult to get far enough away to shoot specimens without blowing them to pieces.'

57. **Stachyrhis maculata,** (Temm.)

Stachyris maculata, *Hartert*, p. 566.

♀ ad. Gedong, South Perak. 12th January. (No. 534)

58. **Stachyrhis davisoni,** Sharpe.

Stachyris nigriceps, *Sharpe* (*nec Hodgs.*), *P.Z.S.*, 1887, p. 440, 1888, p. 275.
Stachyris davisoni, *Sharpe*, *Bull*, *B.O.C.* i, p. 7 (1892); *Hartert*, p. 566.

♂ ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

A specimen of Davison's Babbler agrees with others from the Malay Peninsula in having the breast paler in colour than in birds from Sumatra (*S. larvata*) and Borneo (*S. borneensis*). Whether these latter are really distinct from one another seems doubtful.

59. **Alcippe peracensis,** Sharpe.

Alcippe peracensis, *Sharpe*, *P.Z.S.*, 1887, p. 439; *Hartert*, p. 566.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January.
(Nos. 547, 554, 560, 564, 568, 593, 600)

In the Perak Babbler the iris is reddish-brown, the bill horn-colour, yellow on the tomia, and the feet yellowish-flesh.

'Very common on most of the hills of the main range from three thousand feet upwards.'

60. **Alcippe cinerea,** Blyth.

Alcippe cinerea, *Hartert*, p. 566.

♂, ♀ ad. Bukit Besar, Nawngchik. May. (Nos. 50, 81)

Mr. Robinson describes the soft parts of the Grey Babbler as follows:—

♂ Iris brown, bill lead-coloured, feet plumbeous, pinkish at the upper portion of the tarsus.

♀ Iris brown, bill blackish-brown, feet lead-green.

61. Malacopterum magnirostre, (Moore).

Malacopteron magnirostris, *Hartert*, p. 563.

♂ ad. Bukit Besar, Nawngchik. May and August. (Nos. 21, 350, 362)

The Brown-headed Tree-Babbler has the iris red, chestnut, or dark brown, and the bill and feet lead-colour.

62. Malacopterum cinereum, Eyton

Malacopteron cinereus, *Hartert*, p. 564.

♂ ad. Sungkei, South Perak. 11th February. (No. 654)

In this Tree-Babbler the iris is dark, the bill black, flesh-coloured at the base of the lower mandible, and the feet flesh-coloured.

63. Pellorneum subochraceum, Swinh.

Pellorneum subochraceum, *Hartert*, p. 562.

♀ ad. Biserat, Jalor. 3rd July. (No. 246)
♀ ad. Mabek, Jalor. 26th July. (No. 321)

The Burmese Spotted Babbler has the iris hazel, the upper mandible black, the lower yellowish, and the feet flesh.

'Frequenting low bushes in dense secondary jungle, and very shy and hard to flush. The bird bears a curiously close, but of course purely superficial resemblance to *Anthus rufulus*, which it would be hard to explain in any theory of mimicry.'

64. Gampsorhynchus saturatior, Sharpe

Gampsorhynchus saturatior, *Sharpe*, *P.Z.S.*, 1888, p. 273.

Vix. ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

Three nearly adult female examples of this Shrike-Babbler with the hinder part of the crown still mixed with brown feathers and with lateral traces of the band across the chest, characteristic of youth, shew signs of acquiring white shoulders, one or two white feathers being mixed among the brown plumage. It seems to us very doubtful if Dr. Sharpe's *G. saturatior* can be maintained as a distinct form, for though the type—a freshly-moulted bird in perfect plumage—is darker than specimens of *G. torquatus* in the British Museum collection, the birds before us do not appear separable.

'I have recently obtained numerous specimens of this species in the locality indicated above. They frequented the sides of a steep gully clothed with dense bamboo, and appeared, morning and evening, in flocks of nine or ten. The flight is hurried and never long sustained, and the note a rattling cry somewhat resembling that of the Kera monkey (*Macacus fascicularis*).'

65. Rhinocichla mitrata (S. Müll.)

Rhinocichla mitrata, *Sharpe*, *P.Z.S.*, 1886, p. 352; 1888, p. 274; *Hartert*, p. 562.

♂ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January. (Nos. 537, 579, 587)

Two adult males of the Chestnut-capped Babbling Thrush have the iris chestnut, the naked skin round eye white, the bill orange, and the feet chrome-yellow.

'Almost the most abundant species of bird in the jungles of the main range above three thousand five hundred feet. Generally found in parties of two or three.'

66. Melanocichla lugubris (S. Müll.

Melanocichla lugubris, *Sharpe*, *Cat. B. Brit. Mus.* vii, p. 451 (1883).
Melanocichla peninsularis, *Sharpe*, *P.Z.S.*, 1888, p. 274.

♂ ad. Semangko Pass, Selangor-Pahang border. May. 2,700 feet.

Bill rich orange, iris chestnut, bare skin on each side of the throat livid blue. *M. peninsularis* was founded by Dr. SHARPE on a somewhat worn specimen procured by Mr. L. WRAY on Gunong Batu Patch, in Perak, at an elevation of three thousand four hundred feet. A female bird in the TWEEDDALE collection got by CARL BOCK on Mount Sago, Sumatra, 3rd September, 1878, is indistinguishable from the type of *M. peninsularis*, and I am therefore of opinion that only one species, *M. lugubris*, really exists.

'In habits somewhat similar to *Rhinocichla mitrata*, but more terrestrial. On the three occasions on which I have met with it, it has always been on the ground in flocks of from three to seven individuals.'

PYCNONOTIDAE

67. Otocompsa emeria (Linn.)

Otocompsa emeria, *Hartert*, p. 561.

♂ ad.	Patani.	May and June.	(Nos. 145, 190, 196)
♀ ad.	Ban Sai Kau, Nawngchik.	22nd May.	(No. 127)
♀ ad.	Biserat, Jalor.	5th July.	(No. 245)

This Red-whiskered Bulbul has the iris brownish-chestnut or dark hazel, bill and feet black.

'Extremely common in open country on the east coast littoral, decidedly rare on the western side of the Peninsula.'

68. Pycnonotus finlaysoni, Strickl.

Pycnonotus findlaysoni (*sic*) *Bonhote*, p. 62.
Pycnonotus finlaysoni, *Hartert*, p. 560.

♀ ad. Mabek, Jalor. 23rd July. (Nos. 309, 310)

Finlayson's Bulbul has the iris dark brown, the bill dark horn, and the feet plumbeous.

69. Pycnonotus salvadorii, Sharpe.

Pycnonotus salvadorii, *Hartert*, p. 561.

♀ ad. Gedong, South Perak. 12th January. (No. 532)

In Salvadori's Bulbul the iris is chestnut, the bill horn colour, whitish at the base, and the feet brownish-horn.

'Shot in dense bamboo-jungle.'

70. Pycnonotus analis, (Horsf.)

Pycnonotus goiavier analis, *Bonhote*, p. 62 ; *Hartert*, p. 560.

♂ ad. et ♀ imm.	Patani.	June, September, and October.	(Nos. 194, 414, 436)
♀ ad.	Biserat, Jalor.	15th July.	(No. 279)
♀ ad.	Gedong, South Perak.	9th January.	(No. 511)
♀ ad.	Sungkei, South Perak.	8th February.	(No. 630)

In the Yellow-vented Bulbul the iris is hazel, and the bill and feet black.

'This species and the Magpie-Robin (*Copsychus musicus*) are, perhaps, the commonest and most characteristic birds of the towns and villages throughout the Malay Peninsula. It is quarrelsome and pugnacious in its habits, and is almost invariably found in pairs. The note is a very unmusical crescendo chuckle terminating abruptly. Malay name, *Mĕrĕbah*.'

71. Pycnonotus robinsoni, sp. nov.

This species is most nearly allied to *P. cinereifrons*, from Palawan, but differs in lacking the grey markings on the forehead, which is uniform olive-brown, much like the rest of the crown. From *P. plumosus* it is distinguished by having more distinct white shaft-streaks to the feathers of the cheeks and ear-coverts, the outer edges to the quills dull greenish, not olive-green, and the middle of the breast and belly pale yellowish-white. In possessing the two last characters the present species resembles *P. cinereifrons*.

♂ Total length, 7·0 inches ; wing, 3·35 ; tail, 3·4 ; tarsus, 0·85.
♀ „ 7·0 „ „ 3·2 „ 3·3 „ 0·85.

♂, ♀ ad. Tanjong, Patani. 30th September and 1st October. (Nos. 413, 424)

Robinson's Bulbul has the iris brown, the bill brownish-horn, and the feet blackish-lead.

'As previously noted, the littoral belt of Casuarinas, occurring in certain parts of the Malay Peninsula, seems to support an avifauna not met with elsewhere. The present species flies in flocks of four or five, never stopping long in one tree.'

72. Pycnonotus simplex, Less.

Pycnonotus simplex, *Bonhote*, p. 62 ; *Hartert*, p. 560.

♂, ♀ ad.	Bukit Besar, Nawngchik.	2,500 feet.	3rd May and 30th August.	(Nos. 46 & 370)
♂ ad.	Jeram Kawan, South Perak.		14th February.	(No. 665)
♂ ad.	Gedong, South Perak.		9th January.	(No. 517)
♂ ad.	Sungkei, South Perak.		9th February.	(No. 633)

Moore's Olive Bulbul has the iris red, orange, white, or brown, the bill black, the base of the lower mandible slate-colour, and the feet reddish-brown.

73. Trachycomus ochrocephalus, (Gmel.)

Trachycomus ochrocephalus, *Sharpe*, *P.Z.S.*, 1888, p. 272 ; *Bonhote*, p. 62.

Ad.	Mabek, Jalor.	28th July.	(No. 326)
♂ ad.	Sungkei, South Perak.	7th February.	(No. 613)

The Yellow-crowned Bulbul has the iris yellow or hazel, and the bill and feet black.

The '*Burong-baran-baran*' of the Malays is one of the most beautiful songsters of the Peninsula and very local in its habitat, but common wherever it is found, frequenting thick brushwood by the edge of rivers above tidal limits.

74. Tricholestes criniger, (Blyth).

Tricholestes criniger, *Hartert*, p. 560.

♀ ad.	Gedong, South Perak.	9th January.	(No. 516)

The Bristle-backed Bulbul has the iris hazel, the bill bluish-horn, and the feet yellowish-brown.

75. Criniger tephrogenys, (Jard. and Selb.)

Criniger tephrogenys, *Hartert*, p. 558.

♂, ♀ ad.	Bukit Besar, Nawngchik.	March, May, August.	(Nos. 24, 42, 55, 352)

The Malayan White-throated Bulbul has the iris orange, hazel, or rich brown, the bill bluish lead-colour or black, whitish at base of the lower mandible, and the feet pink or pale yellow.

No examples were obtained of *C. ochraceus*, MOORE, a species which had till recently been overlooked and united with the above under the name *C. gutturalis*, till Dr. HARTERT pointed out the error.

'Very common at certain places and seasons. In the Semangko Pass in May, 1902, it suddenly appeared in enormous numbers, being doubtless attracted by the swarming of a species of termite which was then taking place.'

76. Micropus melanocephalus, Gmel.

Micropus melanocephalus, *Sharpe, Cat. B. Brit. Mus.* vi, p. 65 (1881).

♂ ad. Sungkei, South Perak. 11th February. (No. 651)

A male of the Black-headed Bulbul, has the iris blue, and the bill and feet black.

77. Pinarocichla euptilosa, (J. and S.)

Pinarocichla euptilosa, *Sharpe, Cat. B. Brit. Mus.* vi, p. 62 (1881).

♂ ad. Gedong, South Perak. 9th January. (No. 508)

In the Crested Brown Bulbul the iris is red, and the bill and feet black.

'Met with among low undergrowth in dense jungle, climbing about with restless and jerky movements, alternately raising and depressing its crest.'

78. Iole olivacea, Blyth.

Iole olivacea, *Hartert*, p. 558.

♂ ad. Gedong, South Perak. 11th January. (No. 526)

The Olive Bulbul has the iris chestnut, the bill brown, whitish at the base, and the feet brownish-horn.

79. Iole peracensis, Hartert and Butl.

Iole tickelli (Blyth), *Sharpe, P.Z.S.*, 1887, p. 436 ; *Bonhote*, p. 61.
Iole tickelli peracensis, *Hartert and Butl., Nov. Zool.* v, p. 506 (1898) ; *Hartert*, p. 558.

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 21st to 28th January. (Nos. 565, 599)

This subspecies of *I. tickelli*, which we may call the Perak Bulbul, appears to be well characterized. Three specimens in the national collection, as well as those mentioned above, have the crown darker and the ear-coverts brownish, and in these respects differ constantly from typical *I. tickelli*.

80. Hemixus cinereus, (Blyth.)

Hemixus cinerea, *Bonhote*, p. 61 ; *Hartert*, p. 557.

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. April and August.
(Nos. 18, 344, 363, 368, 369)

In the Grey Bulbul the iris is chestnut and the bill and feet black.

'Fairly common in the above locality, and also at Telôm.

'In life the loose moustachial feathers are continually depressed and extended exactly as in the case of certain Australian Fly-catchers of the genus *Arses*.'

81. Hemixus malaccensis, Blyth.

Hemixus malaccensis, *Hartert*, p. 558.

♂, ♀ ad. Jeram Kawan, South Perak. 15th February. (Nos. 670, 671)

The Malayan Bulbul has the iris chestnut, the bill black, reddish at the base ; and the feet brownish.

82. Irena cyanea, Begbie.

Irena cyanea, *Hartert*, p. 557.
Irena puella, *Bonhote* (*nec. Lath.*), p. 62.

♂, ♀ ad. et. imm. Bukit Besar, Nawngchik. 2,500 feet. April, May, August, and September.
(Nos. 19, 23, 39, 44, 47, 62, 73, 101, 348, 355, 359, 376, 377, 378, 379)

A fine series of the Malayan Fairy Blue-bird was collected. It is represented in all stages of plumage, from the young in female dress to the fully adult.

'Only met with in this one locality, where it was very abundant in parties of five or six, which, as a rule, included only one fully plumaged male, feeding on the fruit of a species of *Ficus*. The skin of this bird is extraordinarily tender, and it is almost as difficult to skin as the Trogons.'

83. Chloropsis cyanopogon, (Temm.)

Chloropsis cyanopogon, *Hartert*, p. 557.

♀ vix ad. Mabek, Jalor. 23rd July. (No. 322)

The Blue-whiskered *Chloropsis* is represented by a nearly adult female, with the blue streak partially developed on one side only.

'Not uncommon, but difficult to see or shoot on account of the close assimilation between the colour of its plumage and the thick foliage which it seldom leaves. With other species of a general green colour it shares the Malay name of *Burong daun* (Leaf-bird).'

84. Chloropsis hardwickii, J. and S.

Chloropsis hardwickii, *Sharpe, Cat. Birds, Brit. Mus.* vi, p. 18 (1881).

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 21st January. (No. 562)

An adult male of the Orange-bellied Chloropsis, has the iris dark, bill black, and feet French-grey.

85. Chloropis zosterops, Vig.

Chloropsis zosterops, *Sharpe, Cat. B. Brit. Mus.* vi, p. 24 (1881).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. May and August.
(Nos. 33, 51, 99, 356, 357, 371)

The Malachite-shouldered Chloropsis has the iris dark brown, the bill black, and the feet lead-grey.

'We found this species, together with *Irena cyanea*, extraordinarily local in habit, occurring only in a small patch of jungle, on Bukit Besar, where a species of *Ficus* was fruiting in great abundance.'

86. Chloropsis icterocephala (Less.)

Chloropsis icterocephalus, *Hartert*, p. 557.

The Malayan Chloropsis is represented by several pairs. The iris is dark brown, the bill black, and the feet plumbeous-green.

87. Aethorhynchus lafresnayi, (Hartl.)

Aethorhynchus lafresnayi, *Sharpe, Cat. B. Brit. Mus.* vi, p. 14 (1881).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. May and September. (Nos. 90 and 381)

The Great Iora is a rare species in collections, and the specimens collected by Messrs. Annandale and Robinson are a valuable addition to the National Collection. Iris brown, bill bluish-lead colour, feet yellowish.

'Though local, this bird is not really uncommon in deep jungle on hills of moderate elevation throughout the Peninsula. It is, however, difficult to procure, as it keeps to the tops of the highest trees.'

88. Aegithina viridissima, (Bonap.)

Aegithina viridissima, *Sharpe, Cat. B. Brit. Mus.* vi, p. 6 (1881).

♀ (♂ ? Native Coll.) Gedong, South Perak. 8th January. (No. 506)

The example of the Green Iora is no doubt an adult female. The iris is white, the bill and feet pale lead-blue.

'Shot in thick bamboo jungle.'

89. Aegithina tiphia (Linn.)

Aegithina tiphia, *Bonhote*, p. 61 ; *Hartert*, p. 557.

♀ ad. et ♂ imm.	Biserat, Jalor.	July and October.	(No. 450)
♀ ad. et ♂ imm.	Patani.	April and June.	(Nos. 177, 188)
♂ ad.	Sungkei, South Perak.	7th February.	(No. 623)

Two males of the Common Iora from Patani and Biserat, are rather dull-coloured birds, and doubtless immature. They show no traces of black on the crown. In a fully adult male procured at Sungkei in February the feathers of the top of the head and nape are very slightly edged with black, and the chest is deep, brilliant yellow.

'Common in the neighbourhood of villages throughout the Peninsula.'

CAMPOPHAGIDAE

90. Graucalus sumatrensis, (S. Müll.)

Graucalus sumatrensis, *Hartert*, p. 554.

♂ ad. Sungkei, South Perak. 8th February. (No. 628)

The Sumatran Cuckoo-Shrike has the iris whitish and the bill and feet black.

'Apparently confined to the lowlands, where it seems to be rare. In the mountains its place is taken by *G. larutensis*, SHARPE, of which I have recently collected several specimens, and which seems to be a far more locally abundant species.'

91. Pericrocotus cinereus, Lafr.

Pericrocotus cinereus, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 83 (1879).

♂ imm. Sungkei, South Perak. 13th February. (No. 637)

The Ashy Minivet is represented by one immature male, with the iris hazel, and the bill and feet black.

92. Pericrocotus flammifer, Hume.

Pericrocotus flammifer, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 74 (1879).

♂ ad. Semangko Pass, East Selangor. November. (Butler Coll.)

Mr. OATES' key to the species of *Pericrocotus* (cf. *Faun. Brit. Ind.* i, p. 478 (1889)) is somewhat misleading, for when he speaks of the first two or more primary quills being entirely black, he evidently refers to the *outer webs* only. Thus the present species, DAVISON'S Scarlet Minivet, comes under the heading:—'b^3 First three primaries entirely black,' but, as a matter of fact, the third quill has a well-marked red patch on the margin of the inner web.

93. Pericrocotus montanus, Salvad.

Pericrocotus montanus, *Hartert*, p. 554.
Pericrocotus wrayi, *Sharpe*, *P.Z.S.*, 1888, p. 269, pl. xv.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. (Nos. 539, 575, 596)

Wray's Scarlet Minivet has the iris brown and the bill and feet black.

94. Pericrocotus croceus, Sharpe.

Pericrocotus croceus, *Sharpe*, *P.Z.S.*, 1888, p. 269 ; *Bonhote*, p. 60 ; *Hartert*, p. 555.

♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January. (Nos. 540, 576)

This species was described by Dr. Sharpe from a single male example procured by Mr. L. Wray on Gunong Batu Putch. It appears to be a well-defined form, and not a mere colour-variety of *P. montanus* as Dr. Sharpe was inclined to believe. In March, 1898, Mr. A. L. Butler procured a female of this species on Gunong Ijas, (4,000 feet); it was at first identified by Dr. Hartert as a female of *P. montanus*, but subsequently correctly determined as *P. croceus* and the distinctive differences were indicated. In 1899, the 'Skeat' Expedition procured an adult male at Gunong Inas, Perak, (4,000 feet). Two adult females in the present collection resemble the female of *P. montanus* in the coloration of the underparts, but the top of the head and back are dull glossy black, instead of dark grey, and the lower back and rump are clear orange-yellow, instead of dusky-yellow. They resemble the male type of *P. croceus* in all respects, but the chin is white and the throat yellow as in the female of *P. montanus*.

'The habits of the all species of Minivets in the Peninsula are very similar. Only *P. flammifer* is at all common below three thousand feet, the others being usually found in parties of three or four flying about the branches of lofty trees, but never staying long in one place. As a rule, the sexes seem to keep together, and males are very much commoner than females.'

MUSCICAPIDAE

95. Culicicapa ceylonensis, (Swains.)

Culicicapa ceylonensis, *Sharpe*, *P.Z.S.*, 1888, p. 271 ; *Hartert*, p. 553.

♂ ad. Bukit Besar, Nawngchik. 2,500 feet. May, August, and September.
(Nos. 40, 351, 374)

The Grey-headed Fly-catcher has the iris hazel, bill black above, pinkish beneath, feet brown or pale gamboge, soles orange.

96. Stoparola thalassinoides, (Cab.)

Stoparola thalassinoides, *Sharpe*, *P.Z.S.*, 1888, p. 271.
Stoparola thalassoides (sic), *Hartert*, p. 553.

♂, ♀ ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

The above male of the Sea-blue Fly-catcher and other specimens in the national collection are much less brilliant than one collected by Mr. L. WRAY at Larut, Perak. The latter skin is not dated, but appears to be freshly moulted, which no doubt accounts for its much brighter plumage.

97. Philentoma velatum, (Temm.)

Philentoma velatum, *Sharpe*, *P.Z.S.*, 1888, p. 271 ; *Hartert*, 553.

♀. Bukit Besar, Nawngchik. 2,500 feet. 5th May. (No. 64)

A female of the Maroon-breasted Fly-catcher has the iris reddish-brown and the bill and feet black.

98. Philentoma pyrrhopterum, (Temm.)

Philentoma pyrhoptera (sic), *Hartert*, p. 553.
Philentoma pyrrhopterum, *Sharpe*, *P.Z.S.*, 1888, p. 271.

♂ ad. Bukit Besar, Nawngchik. 9th May. (No. 77)

An adult male of the Chestnut-winged Fly-catcher has the iris red, the bill pale lead-colour, and the feet black.

99. Rhipidura javanica, Sparrm.

Rhipidura javanica, *Bonhote*, p. 60.

♂, ♀ ad. et imm. Patani. June, September, and October. (Nos. 189, 419, and 432)

The Javan Fantail Fly-catcher has the iris pale hazel and the bill and feet black.

'Very abundant on the east coast of the Peninsula, but not extending far inland ; rarer but more generally distributed in Perak and Selangor, and found at greater distances from the coast. Known to the Malays as the *Murai gila*, or mad thrush, on account of its curious dancing movements.'

100. Rhipidura albicollis (Vieill.)

Rhipidura albicollis atrata, Salvad., *Sharpe*, *P.Z.S.*, 1887, p. 435; *Hartert*, p. 552.

♀ ad. Telôm, Perak-Pahang border. 22nd January. (No. 573)

The large series of skins in the British Museum, ranging from India to the Malay Peninsula, clearly shews that the width of the white tips to the tail-feathers is an unimportant character, and that *R. atrata*, of SALVADORI, has no claim to specific rank. The iris is brown, the bill black, and the feet brownish-grey.

'Not rare at Telôm, and in habits precisely resembling the foregoing species.'

101. Terpsiphone incii, Gould.

Terpsiphone incii, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 350 (1879).

♂ imm.	Ban Sai Kau, Nawngchik.		17th September.	(No. 395)
♂ juv.	Bukit Besar.	2,500 feet.	30th April.	(No. 17)

An immature male of INCE's Paradise Fly-catcher has the iris brown, the bill cobalt-blue, and the feet lead-colour; a still younger male in first plumage is similar, but the bill is lead-colour, tinged with pink.

102. Terpsiphone affinis, (Blyth.)

Terpsiphone affinis, *Sharpe*, *P.Z.S.*, 1888, p. 270; *Bonhote*, p. 60; *Hartert*, p. 553.

♂, ♀ ad. et imm.	Bukit Besar, Nawngchik. (Nos. 58, 63, 64, 71, 86, 92, 95)	2,500 feet.	May.
♂ ad.	Gedong, South Perak. (No. 533)		12th January.

Adult males of the Burmese Paradise Fly-catcher have the iris chestnut-brown, the bill cobalt-blue, the inside of the mouth emerald-green, the wattle round the eye cobalt-blue, and the feet blue-grey.

The female has the bill dark horn, paler at the base.

'This wonderful Fly-catcher, perhaps the most beautiful of all birds, was very abundant on Bukit Besar, though full-plumaged males in good condition were somewhat hard to procure, as they were very shy and restless. They are very proud of their plumage, and display it by perching across a bough, depressing and half-spreading the wings and raising and expanding the tail, a habit which is shared by the Shama and the Magpie-Robin.

'A nest was found on Bukit Besar on the 7th May. It was built in the fork of a small sapling about eight feet from the ground, and externally has a deep crucible-shaped cup covered with moss, and internally a shallow oval cup lined with the fine black tendrils of a creeper.

'Malay name, *Mirbau ekor gading* (Ivory-tailed Thrush).

'The food consists largely of evil-smelling Bugs, such as *Acanthocoris scalier.*' N.A.

103. Hypothymis azurea, (Bodd.)

Hypothymis azurea, *Hartert*, p. 552.

♂, ♀ ad.	Bukit Besar, Nawngchik.	May and August.	(Nos. 82, 361)
♂ ad.	Mabek, Jalor.	July.	

The Azure Fly-catcher has the iris red, the bill bright cobalt-blue, and the feet bluish-lead colour.

'A very uncommon bird in the East Coast States. The specimens obtained were all shot in high trees growing over streams.'

104. Poliomyias luteola (Pall.)

Poliomyias luteola, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 201 (1879).

♂ imm.	Telôm, Perak-Pahang border.	22nd January.	(No. 572)

The Rufous-breasted Fly-catcher appears to be a winter visitor to the Malay Peninsula. The iris is black, the bill horn-coloured, the gape yellow, and the feet black.

105. Niltava decipiens, Salvad.

Niltava grandis, *Sharpe*, *P.Z.S.*, 1886, p. 351; 1887, p. 436; 1888, p. 272.
Niltava grandis decipiens, *Hartert*, p. 551.

♀ *.	Telôm, Perak-Pahang border.	20th and 26th January.	(Nos. 557, 592)
♂ juv.	Gunong Berumban.	28th January.	(No. 601)

The females of this form, as Mr. HARTERT has already remarked, are easily distinguished from the females of *N. grandis* by having the top of the head and nape strongly washed with purplish-blue, and by their smaller size, the wing measuring 3·7 inch in length in the present species, and 4·2 inch in *N. grandis*. The national collection contains a specimen of the adult male from Lolo, Sumatra (*Carl Bock*), TWEEDDALE collection, and a female obtained by Mr. L. WRAY at Batang-Padang, Perak. The latter is remarkable in having two of the outer tail-feathers on the right side blue.

106. Alseonax latirostris, (Raffl.)

Alseonax latirostris, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 127 (1879).

♀ ad.	Telôm, Perak-Pahang border.	4,000 feet.	22nd January.	(No. 567)
♀ ad.	Gedong, South Perak.		12th January.	(No. 530)

Two females of the Brown Fly-catcher have the iris hazel, the bill black, yellow at the base of lower mandible, and the feet brownish.

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* One of the two birds collected at Telôm is marked as a male—no doubt a mistake has been made.

107. **Hemichelidon ferruginea,** Hodgs.

Hemichelidon ferruginea, *Hartert*, p. 549.

♂ ad. Telôm, Perak-Pahang border. 3,500 feet. 17th January. (No. 536)

A male of the Ferruginous Fly-catcher has the iris brown, the bill black, and the feet flesh-colour.

HIRUNDINIDAE

108. **Hirundo badia,** (Cass.)

Hirundo badia, *Bonhote*, p. 66.

♀ ad. et. imm. Biserat, Jalor. 28th June and 13th July. (Nos. 213, 233, 274)

Two adult females with the tails deeply forked and measuring, respectively, 3·7 and 3·8 inches, have distinct black shafts to all the chestnut feathers of the underparts. In an immature female with the tail less deeply forked, measuring only 3·0 inches in length, and with the secondaries and greater wing-coverts narrowly margined at the tips with rufous, the black shaft streaks on the feathers of the underparts are *only indicated on some of the feathers of the chest.* This difference is important and does not appear to have been properly recorded.

The Malayan Chestnut Swallow has the iris hazel, the bill black, yellow at the gape, and the feet fleshy-brown.

'This species seems only to be found in the precipitous limestone hills, honeycomed with caves, which are so characteristic a feature of certain parts of the Malay Peninsula. Round these hills it is very abundant, nesting in the entrances of the caves and beneath overhanging ledges of the cliffs.'

109. **Hirundo gutturalis,** (Scop.)

Hirundo gutturalis, *Sharpe*, *P.Z.S.*, 1887, p. 442.

♀ imm.	Patani Town.	30th September.	(No. 415)
♂ imm.	Nawngchik.	28th November.	(Nos. 485, 486)
♀ imm.	Anak Bukit.	24th April.	(No. 8)
♂, ♀ ad.	Kampong, Jalor.	4th November.	

The six specimens of the Eastern Chimney-Swallow are most immature. Adults have the iris dark brown, and the bill and feet black.

PITTIDAE

110. **Pitta cyanoptera,** Temm.

Pitta cyanoptera, *Bonhote*, p. 67.

♂ ad.	Bukit Jalor.	28th October.	(No. 456)
♀ ad.	Kampong, Jalor.	3rd November.	(No. 465)

The Lesser Blue-winged Pitta has the iris dark hazel, the bill black, and the feet flesh-colour.

'Pittas are very local birds in the Malay Peninsula, and only this species was met with by us. It is, undoubtedly, a migrating bird in the Patani States, arriving at the commencement of the wet season. At Tanjong Patani, large numbers are annually caught in the ground-nets after landing in an exhausted condition. The specimens mentioned above were snared by little Malay boys in a swampy patch of jungle at the foot of a precipitous limestone hill.'

Malay name, *Burong lah*, or *Burong pachat*, (Leech-bird).

EURYLAEMIDAE

111. **Calyptomena viridis,** Raffl.

Calyptomena viridis, *Sharpe*, *P.Z.S.*, 1887, p. 432 ; *Bonhote*, p. 67 ; *Hartert*, p. 548.

♂, ♀ ad. Bukit Besar, Nawngchik. 9th May. (Nos. 69, 75)

The Green Broadbill has the iris black, the bill dull-green, yellow on the tomia and at the tip of the culmen, and the feet greenish.

'Local ; usually in heavy jungle, but occasionally in secondary growths on the outskirts of villages.'

112. **Eurylaemus ochromelas,** Raffl.

Eurylaemus ochromelas, *Sharpe*, *P.Z.S.*, 1887, p. 432 ; *Bonhote*, p. 68.

♀ ad. Sungkei, South Perak. 10th February. (No. 641)

The Black and Yellow Broadbill has the iris whitish, the feet yellowish-flesh, and the bill pale blue, with the tomia black.

'Shot on a banyan tree, in company with many other species of frugivorous birds.'

113. **Cymborhynchus macrorhynchus,** (Gmel.)

Cymborhynchus macrorhynchus, *Bonhote*, p. 68.

Cymbirhynchus macrorhynchus lemniscatus (Raffl.), *Hartert*, p. 548.

♀ ad.	Biserat, Jalor.	5th July.	(No. 241)
♂ ad., imm. et juv.	Mabek, Jalor.	22nd to 25th July.	(Nos. 303, 304, 317, 318, 319)
♀, ♂ ad.	Sungkei, South Perak.	7th and 8th February.	(Nos. 615, 627)
♀ ad.	Gedong, South Perak.	9th and 10th January.	(Nos. 512, 515, 519)

The Black and Red Broadbill has the iris dark emerald-green, the bill blue, the base of the lower mandible chrome-yellow, and the feet bluish lead-colour.

A nest of this species known as the *Burong hujan-hujan* was found at Mabek, on July 22nd, in secondary jungle, suspended from the projecting limb of a small tree, about eight feet from the ground, and looking like a mass of debris left there by a flood. The nesting-chamber was formed in the upper portion of an elongate oval, about 270 mm. long, and 360 mm. in its greatest diameter, and was entered by a circular hole furnished with an eave. The materials were palm fibres, twigs, creepers and aerial roots with a few leaves, the inside was neatly lined with grass, and the eggs, which were three in number, were deposited on a bed of fresh, green leaves. In shape the eggs were slightly elongate ovals, the shell being rather dull, and of a pinky-white colour, thickly covered with dark terra-cotta-brown blotches fairly evenly distributed, though they form a rather thick zone towards the larger end of one egg. Dimensions: A, 26·5 × 19; B, 27 × 19·75; C, 27·5 × 19 mm.

114. Corydon sumatranus, Raffl.

Corydon sumatranus, *Sharpe*, *P.Z.S.*, 1888, p. 278; *Hartert*, p. 548.

♂ ad. Gedong, South Perak. 12th January. (No. 528)

The Dusky Broadbill has the iris brown, the orbital skin pink, the bill pink, lavender on the tomia and tip of the culmen, and the feet brownish.

A nest of this species was found at Sungkei Tali, Ulu Bentong, Pahang, on the 16th December, 1904. It is a very large pendant pyriform structure made of dead creepers, etc., somewhat loosely interwoven, the entrance low down on one side, and the lining and foundation formed of flat strips of palm-leaf. It was suspended from the end of a ratan thirty feet from the ground, and contained three highly incubated eggs. These are rather wide, blunt ovals. In all three the ground colour is pinkish-white, but the markings vary, one having the small yellowish-brown surface spots and pale lavender shell-marks evenly distributed all over the shell; in a second, the spots, though equally fine, are mostly concentrated towards the larger end of the shell, the smaller end being almost devoid of markings; while in the third the spots are larger, the majority being clustered round the larger end, and the remainder sparingly scattered over the rest of the shell. The measurements in all three are 1·2 × ·95 inch.

PICIDAE

115. Sasia abnormis, (Temm.)

Sasia abnormis, *Sharpe*, *P.Z.S.*, 1888, p. 279.

Sasia abnormis everetti, Hargitt, *Hartert*, p. 547.

♂ ad. Bukit Besar. 2,500 feet. 5th and 11th May. (No. 59)

The Malayan Piculet has the iris carmine, the skin round the eye pinkish-red, the upper mandible black, and the lower pale horn-colour or lemon-yellow, and the feet gamboge-yellow.

'The habits of this Piculet, as has also been noted by BUTLER in the case of *S. innominata*, differ considerably from those of the true Wood-peckers. Both my specimens were shot among the terminal twigs of small trees, and nearly invariably perched across the boughs, and not longitudinally.'

116. Iyngipicus canicapillus, Blyth.

Yungipicus canicapillus, *Hartert*, p. 547.

♂, ♀ ad.	Patani.	1st June and 6th October.	(No. 146)
♂ ad.	Biserat, Jalor.	13th July.	(No. 275)
♂, ♀ ad.	Jambu, Jhering.	5th and 7th June.	(Nos. 147, 148, 163, 164)

The Burmese Pigmy-Woodpecker has the iris brown or hazel, the bill bluish horn-colour, the base of the lower mandible whitish, and the feet olive-green.

117. Miglyptes tukki, (Less.)

Miglyptes tukki, *Sharpe*, *P.Z.S.*, 1888, p. 279 ; *Bonhote*, p. 71.
Meiglyptes tukki, *Hartert*, p. 547.

♂, ♀ ad. Ban Sai Kau. 24th May. (Nos. 129, 130)

The Buff-necked Barred Woodpecker has the iris hazel, the upper mandible black, the lower bluish-horn, and the feet brownish-grey.

118. Miglyptes grammithorax, (Malh.)

Miglyptes grammithorax, *Sharpe*, *P.Z.S.*, 1887, p. 443 ; *Bonhote*, p. 71.
Meiglyptes grammithorax, *Hartert*, p. 547.

♂ ad.	Kampong Mabek, Jalor.	22nd July.	(No. 298)
♀ ad.	Bukit Besar.	28th August.	(No. 358)

The Fulvous-rumped Barred Woodpecker has the iris hazel, the bill bluish-horn, and the feet greenish.

119. Hemicercus sordidus, Eyton.

Hemicercus concretus sordidus, *Hartert*, p. 547.

(♂) ♀ ad. Gedong, South Perak. 10th January. (No. 521)

In the Grey and Buff Woodpecker the iris is brown, the bill bluish-horn, and the feet greenish lead-colour.

120. **Chrysocolaptes validus,** (Temm.)

Chrysocolaptes validus, *Bonhote*, p. 72.

♀ ad. Gedong, South Perak. 10th January. (No. 522)

The Orange-backed Woodpecker has the iris chocolate-brown, the bill yellowish-horn, and the feet greenish lead-colour.

121. **Chrysocolaptes guttacristatus,** (Tick.)

Chrysocolaptes guttacristatus, *Hargitt*, *Cat. B. Brit. Mus.* xviii, p. 448 (1890).

♀ ad. Biserat, Jalor. 29th June. (No. 211)

Tickell's Golden-backed Woodpecker has the iris chestnut, the bill bluish-horn, and the feet greenish lead-colour.

122. **Tiga javanensis,** (Ljung.)

Tiga javanensis, *Bonhote*, p. 72; *Hartert*, p. 547.

♂ ad.	Patani.	10th and 15th June.	(No. 195)
♂, ♀ ad.	Ban Sai Kau, Nawngchik.	24th May and 9th September.	(Nos. 132, 133, 384)
♂, ♀ ad.	Biserat, Jalor.	15th and 18th July.	(Nos. 278, 292)
♂ ad.	Jambu, Jhering.	5th June.	(No. 150)

The Golden-backed Three-toed Woodpecker has the iris chestnut, the bill bluish-horn, and the feet greenish-slate.

This species is eminently a denizen of cultivated lands, and I have hardly ever seen it outside the groves of cocoanut and Penang palms which surround every Malay village. It feeds mainly on ants, principally the tailor-ant (*Oecoplylla smaragdina*), but I have observed it attack and swallow a small flying lizard (*Draco volans*).

123. **Micropternus brachyurus,** (Vieill.)

Micropternus brachyurus, *Sharpe*, *P.Z.S.*, 1888, p. 279; *Bonhote*, p. 72; *Hartert*, p. 547.

♀ ad.	Gedong, South Perak.	9th January.	(Nos. 509, 520)
♂ ad.	Biserat Jalor.	30th June.	(No. 220)
♂, ♀ ad.	Sungkei, South Perak.	7th February.	(Nos. 618, 626)

The Malay Rufous Woodpecker has the iris brown, the bill dull black, and the feet greenish-grey.

124. **Micropternus phaeoceps,** Blyth.

Micropternus phaeoceps, *Hargitt*, *Cat. B. Brit. Mus.* xviii, p. 393 (1890).

♀ ad. Biserat, Jalor. 30th June. (No. 219)

A female of the Northern Rufous Woodpecker has the iris dark hazel, the bill bluish-horn, and the feet greenish-grey.

This is probably the most southern limit of the species.

125. Gauropicoides rafflesi, (Vig.)

Gauropicoides rafflesi, *Hargitt, Cat. B. Brit. Mus.* xviii, p. 132 (1890).

♀ ad. Telôm, Perak-Pahang border. 18th January. (No. 544)

RAFFLES' Three-toed Woodpecker has the iris sienna, the bill bluish-horn colour, and the feet plumbeous-green.

'By no means common; the present specimen and one from Northern Pahang, now in the Selangor Museum, are the only specimens I have seen from any Peninsular locality north of the territory of Malacca.'

126. Chrysophlegma wrayi, Sharpe.

Chrysophlegma wrayi, *Sharpe, P.Z.S.*, 1888, p. 279; *Bonhote*, p. 71.

♀ ad. Telôm, Perak-Pahang border. 4,000 feet. 24th January. (No. 578)

WRAY'S Woodpecker has the iris bright chestnut-red, the bill bluish-lead colour, greener on the lower mandible, and the feet greenish-lead colour.

'Though rare in collections, this Woodpecker is very common throughout the mountain jungles of the main range of the Peninsula above about three thousand feet, generally flying in pairs, and when disturbed uttering a cry very similar to that of the English Green Woodpecker.'

127. Chrysophlegma malaccense, (Lath.)

Chrysophlegma malaccense, *Sharpe, P.Z.S.*, 1887, p. 442; *Bonhote*, p. 71.
Chrysophlegma miniatus malaccensis, *Hartert*, p. 546.

♂ ad. Patani. 19th June. (No. 200)

The Banded Red Woodpecker has the iris reddish-brown, the bill bluish-horn, paler at tip, and the feet greenish.

128. Chrysophlegma humei, Hargitt.

Chrysophlegma humei, *Hartert*, p. 546.

♀ ad. Bukit Besar, Nawngchik. 2,500 feet. August and September. (Nos. 345, 380)

The Checkered-throated Woodpecker has the iris chocolate, the upper mandible black, the lower bluish-horn, and the feet greenish-lead colour.

'Not common in any part of the Peninsula, keeping to the upper branches of tall forest trees, and hence rather difficult to obtain.'

129. Gecinus puniceus, (Horsf.)

Gecinus puniceus, *Sharpe*, *P.Z.S.*, 1888, p. 279.

Gecinus puniceus observandus, *Hartert*, *Nov. Zool.* iii, p. 542 (1896), and ix, p. 547 (1902).

♂ ad. Kampong, Jalor. 18th November. (No. 474)

The Crimson-winged Green Woodpecker has the iris red, the bill dull olive, pale yellow beneath, and the feet greenish-lead colour.

130. Gecinus viridanus, (Blyth)

Gecinus viridanus, *Hargitt*, *Cat. B. Brit. Mus.* xviii, p. 47 (1890).

♂ ad.	Patani.	10th June.	(No. 174)
♀ ad.	Biserat, Jalor.	5th July.	(No. 248)

The Burmese Scaly-bellied Green Woodpecker has the iris chestnut, the upper mandible black, greenish towards the base, and the lower mandible greenish-yellow with black tip.

'Common among the Casuarinas on the coast, but rare elsewhere; south of the latitude of Penang it appears to be replaced in similar situations by the allied *G. vittatus.*'

CAPITONIDAE

131. Psilopogon pyrolophus, S. Mull.

Psilopogon pyrolophus, *Sharpe*, *P.Z.S.*, 1886, p. 352; 1887, p. 442; *Shelley*, *Cat. B. Brit. Mus.* xix, p. 98 (1891).

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 23rd and 25th January. (Nos. 574, 585)

In the Fire-tufted Barbet the iris is reddish-brown with an outer ring of whitish, the bill apple-green with a dark vertical band, and the feet greenish-lead colour.

132. Xantholaema haematocephala, Marshall.

Xantholaema haematocephala, *Bonhote*, p. 73.

♂ ad.	Ban Sai Kau.	19th May.	(No. 104)
♂ ad. et. ♀ imm.	Biserat, Jalor.	30th June, 14th July.	(Nos. 222, 276)

The Crimson-gorgeted Barbet or Coppersmith has the iris dark hazel, the orbital region crimson-lake, the bill black, and the feet bright coral-pink.

'Fairly abundant in Patani and the neighbouring States, but decidedly scarcer on the west coast. The note from which it derives its name is frequently heard at noon, when nearly all other birds are silent. Curiously enough its Malay appellation is *Tukang besi* (Blacksmith).'

133. Mesobucco duvauceli (Less.)

Mesobucco duvauceli, *Bonhote*, p. 73.

♀ imm. Bukit Besar, Nawngchik. 16th May. (No. 96)
♂ ad. Sungkei, South Perak. 11th February. (No. 650)

The Black-eared Barbet has the iris dark brown, the bill black, and the feet plumbeous.

134. Thereiceryx hodgsoni, (Bonap.)

Cyanops lineata (Vieill.); *Bonhote*, p. 73.
Thereiceryx lineatus hodgsoni, *Hartert*, p. 546.

♂ ad. Patani. 10th June. (No. 176)

Hodgson's Barbet has the iris hazel, the bare orbital skin orange-yellow, the bill orange-brown, and the feet pale gamboge-yellow.

135. Cyanops mystacophanes, (Temm.)

Cyanops mystacophanes, *Bonhote*, p. 73.

♂, ♀ ad. et. imm. Bukit Besar, Nawngchik. 2,500 feet. March, May, August, and September. (Nos. 38, 41, 43, 53, 72, 84, 98, 349, 363, 372)
♂ ad. et. imm. Biserat, Jalor. 9th and 18th July. (Nos. 259, 270, 290)

The Gaudy Barbet has the iris brown, the bill black, and the feet greenish-yellow.

136. Cyanops henricii, (Temm.)

Cyanops henricii, *Bonhote*, p. 72.

♂ ad. Jeram Kawan, South Perak. 15th February. (No. 668)

In Henrici's Blue-throated Barbet the iris is brown, the bill black, and the feet plumbeous-green.

'The habits of all the Barbets are very similar, and what is said of one will equally apply to most of the others. With the exception of *Xanthbolaema haematocephala* and *Mesobucco duvauceli* which are frequently found in orchards, and *Thereiceryx hodgsoni* which inhabits the coastal belt, they are usually inhabitants of old jungle, though, when certain trees, more especially figs, are in fruit, they may be found in the environs of villages. The peculiar clanking calls which are so characteristic a sound in Malay forests, are probably referable to Barbets, but it is difficult to say with certainty, as the birds invariably become silent when the tree in which they are feeding is approached. They are shy and retiring and exceedingly difficult to localize among the branches, notwithstanding their gaudy colours.'

137. Chotorhea chrysopogon, (Temm.)

Chotorhea chrysopogon, *Bonhote*, p. 72.

♂ imm.	Bukit Besar, Nawngchik.	2,500 feet.	28th August.	(No. 354)
♀ ad.	Sungkei, South Perak.		10th February.	(No. 647)

The Golden-bearded Barbet has the iris brown, the bill black, and the feet plumbeous-green.

138. Chotorhea versicolor, (Raffl.)

Megalaema versicolor, *Sharpe*, *P.Z.S.*, 1888, p. 280.

♂ ad.	Gedong, South Perak.	12th January.	(No. 529)

The Beautiful Barbet has the iris black, the bill black, and the feet greenish.

CUCULIDAE

139. Rhopodytes tristis, (Less.)

Rhopodytes tristis, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Ban Sai Kau.	20th May.	(No. 106)
♂ ad.	Biserat.	28th June and 17th October.	(Nos. 214, 449)
♂, ♀ ad.	Jambu.	6th and 12th June.	(Nos. 156, 182)

The Large Green-billed Malkoha has the iris hazel, the orbital skin lake-red, the bill pale sea-green, and the feet greenish-grey.

'Very common among bamboos around villages, but rarely found in old jungle. Very weak in flight, and loth to use its wings unless hard pressed. In Perak and Selangor this species is only found in the hills, and the Patani river seems to be about its southern limit for low country. I have never seen it on the ground as mentioned by Davison. In Patani most Cuckoos of the group *Phoenicophainae* are called *Burong kĕra*, probably from the chuckling note which somewhat resembles the sound made by the Kĕra Monkey.'

140. Rhopodytes diardi, (Less.)

Rhopodytes diardi, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Biserat, Jalor.	7th July.	(No. 262)
♂ ad.	Mabek.	23rd and 28th July.	(Nos. 313, 329, 331)
♀ ad.	Sungkei, South Perak.	7th February.	(No. 624)
♀ ad.	Gedong, South Perak.	11th and 12th January.	(Nos. 525, 531)

Diard's Green-billed Malkoha has the iris white, the orbital skin red, the bill sea-green, and the feet lead-colour.

141. **Urococcyx erythrognathus,** (Hartl.)

Urococcyx erythrognathus, *Bonhote*, p. 76.

♀ ad.	Bukit Besar, Nawngchik.	25th August.	(No. 347)
♂ ad.	Ban Sai Kau.	16th September.	(No. 591)
♂ ad.	Kampong Bayu, Biserat.	8th July.	(No. 255)
♀ ad.	Kampong Mabek.	23rd July.	(No. 311)
♂, ♀ ad.	Gedong Batang, Perak.	9th January.	(Nos. 514, 523, 524)

The Greater Red-billed Malkoha has the iris orange or yellow, ocular space crimson, bill pale sea-green, basal half of the lower mandible crimson, and the feet lead-colour.

142. **Rhinortha chlorophaea,** (Raffl.)

Rhinortha chlorophaeus, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♂, ♀*ad.	Biserat, Jalor.	June and July.	(Nos. 218, 268)
♀ ad.	Mabek, Jalor.	23rd July.	(No. 306)
♀ ad.	Sungkei, South Perak.	10th February.	(No. 638)

In RAFFLE's Green-billed Malkoha the iris is dark hazel or yellowish, the orbital skin pale blue, the bill pale sea-green, and the feet bluish-horn.

'Similar in habits to the preceding, but frequenting jungle also, where it climbs about the parasitic creepers depending from the trees, looking more like a squirrel than a bird.'

143. **Zanclostomus javanicus,** (Horsf.)

Zanclostomus javanicus, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Bukit Besar, Nawngchik.	9th May.	(No. 80)
♂ ad.	Biserat, Jalor.	9th July.	(No. 262)

In the Lesser Red-billed Malkoha the iris is dark hazel, the orbital skin-blue, the bill coral-red, and the feet plumbeous.

'Usually in the hill-jungle.'

144. **Centropus javanicus,** (Dumont.)

Centropus javanicus, *Bonhote*, p. 75.

♂ imm.	Gedong, South Perak.	7th January.	(No. 498)

The immature of the Lesser Coucal has the iris brown, the bill black, horn-coloured at the base, and the feet lead-colour.

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* All the examples of this species are marked '♂' but the sex of three has undoubtedly been wrongly determined.

145. **Centropus sinensis,** (Steph.)

Centropus sinensis, *Bonhote*, p. 74.

♀ ad.	Patani.	22nd June.	(No. 205)
♂ ad. et imm.	Ban Sai Kau.	20th May and 9th September.	(Nos. 115, 385)
♂ imm.	Biserat, Jalor.	10th July.	(No. 266)
♂ ad.	Sungkei, South Perak.	8th and 16th February.	(Nos. 631, 678)

The common Coucal or Crow-Pheasant has the iris red and the bill and feet black.

'Both species of Crow-Pheasant inhabit the brushwood near villages, secondary jungle, and stretches of lalang grass. When disturbed they generally make use of their running powers, but if forced to take to flight resort to the nearest tree, which they ascend by a series of awkward hops from branch to branch.'

146. **Eudynamis horonata,** (Linn.)

Eudynamis horonata, *Bonhote*, p. 74.

♂, ♀ ad.	Nawngchik.	27th and 30th November.	(Nos. 487, 488)
♂ ad.	Ban Sai Kau.	22nd May.	(No. 124)
♂ ad. et juv.	Biserat, Jalor.	30th June and 9th August.	(No. 334)

The Indian Koel has the iris red, the bill greenish-horn, and the feet bluish or greenish-lead colour.

147. **Chalcococcyx xanthorynchus,** (Horsf.)

Chalcococcyx xanthorynchus, *Shelley, Cat. B. Brit. Mus.* xix, p. 289 (1891).

♀ imm.	Bukit Besar, Nawngchik.	11th May.	(No. 89)
♂ ad. et juv.	Biserat, Jalor.	18th July.	(Nos. 289, 291)

The Violet Cuckoo has the iris brown, the eyelid vermilion, the bill yellow, vermilion at base, and the feet black.

148. **Chalcococcyx malayanus,** (Raffl.)

Chalcococcyx malayanus, *Hartert*, p. 545.

♂ ad.	Patani.	13th June.	(No. 186)

The Malayan Bronze Cuckoo has the iris reddish with a whitish line outside the pupil, the eye wattle vermilion, the bill black, and the feet greenish.

149. **Cacomantis merulinus,** (Scop.)

Cacomantis merulinus, *Bonhote*, p. 74 ; *Hartert*, p. 545.

♀ ad. et. imm.	Bukit Besar, Nawngchik.	6th May and 28th November.	(Nos. 67, 483)
♀ juv.	Biserat, Jalor.	3rd July.	

The Rufous-billed Cuckoo has the iris red, the bill horn-colour, the gape yellowish, and the feet yellow.

150. **Surniculus lugubris,** (Horsf.)

Surniculus lugubris, *Hartert*, p. 544.

♂, ♀ ad.	Bukit Besar, Nawngchik.	12th May.	(Nos. 63, 91)
♀ ad.	Mabek, Jalor.	23rd July.	(No. 312)
♂ ad.	Sungkei, South Perak.	10th February.	(Nos. 643, 644)

The Drongo-Cuckoo has the iris dark brown, the bill black, and the feet dull lead-colour.

TROGONIDAE

151. **Pyrotrogon erythrocephalus,** (Gould.)

Harpactes erythrocephalus, *Sharpe*, *P.Z.S.*, 1888, p. 280.

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 24th January. (No. 577)

In the Red-headed Trogon the iris is chestnut-red, the bill and the orbital skin purplish-cobalt, and the feet pinkish.

'Trogons of at least two species are very common at Telôm, but were very difficult to see, and still more difficult to convert into specimens, for, as has been remarked elsewhere, their skin is of the consistency of wet tissue paper. Malay name is *Burong kasumba* (Pink bird).'

152. **Pyrotrogon oreskios,** (Temm.)

Harpactes oreskius, *Sharpe*, *P.Z.S.*, 1888, p. 280.

Pyrotrogon oreskios, *Hartert*, p. 544.

♀ ad. Bukit Besar, Nawngchik. 9th May and 27th August. (Nos. 76 and 353)

The Yellow-breasted Trogon has the iris brown, the bill blue, and the feet lead-colour.

153. **Pyrotrogon duvauceli,** (Temm.)

Harpactes duvauceli, *Sharpe*, *P.Z.S.*, 1886, p. 353 ; *Bonhote*, p. 70.

♂ imm. et. ♀ ad.	Bukit Besar, Nawngchik.	8th May and 24th August.	(Nos. 68, 341)
♂ ad.	Gedong, South Perak.	11th January.	(No. 527)

The Red-rumped Trogon has the iris dark brown, the orbital skin silvery-cobalt, the bill purplish-cobalt, black on the culmen, and the feet nearly black.

CYPSELIDAE

154. Tachornis infumata, (Scl.)

Tachornis infumata, *Hartert*, *Cat. B. Brit. Mus.* xvi, p. 467 (1892).

♀ ad. Ban Sai Kau. 20th May. (No. 113)

The Little Palm Swift has the iris reddish-brown, the bill black, with the lower mandible red, and the feet greenish.

'It suddenly appeared in large flocks among the cocoa-nut palms at about six p.m. one evening, but was never met with again.'

CAPRIMULGIDAE

155. Caprimulgus macrurus, Horsf.

Caprimulgus macrurus, *Bonhote*, p. 68.
Caprimulgus macrourus, *Hartert*, p. 544.

♀ ad. Ban Sai Kau. 21st May. (No. 119)
♂ ad. Biserat, Jalor. 20th Oct. (No. 451)

Horsfield's Night-jar has the iris hazel, the bill horn, and the feet pinkish flesh-colour.

'Very common in open country throughout the Peninsula during every month of the year.'

156. Caprimulgus jotaka, Temm. and Schl.

Caprimulgus jotaka, *Hartert*, *Cat. B. Brit. Mus.* xvi, p. 552 (1892).

♀ ad. Telôm, Perak-Pahang border. 16th January. (No. 535)

The Jungle Night-jar is a winter visitor to the Malay Peninsula ; it has the iris brown, the bill horn, and the feet pinkish-brown.

'I am inclined to think that this species is resident in the higher mountain-jungles of the Peninsula and not merely a migrant as is generally supposed. I have met with it in March, May, and September, but have never seen it otherwise than in deep jungle.'

BUCEROTIDAE

157. Anthracoceros malabaricus, (Gmel.)

Anthracoceros malabaricus, *Bonhote*, p. 70.

♂, ♀ ad. Mabek, Jalor. 22nd and 25th July. (Nos. 301-320)
♀ ad. Sungkei, South Perak. 10th February. (No. 636)

The male of the Malayan Pied-Hornbill has the iris chestnut, the orbital skin purplish-blue, and the bill ivory-white, with a nearly black patch on the casque. In the female the iris is chestnut-brown, the bare skin of the throat and face silvery-white, livid blue round the eye, the bill pale ivory-yellow with a black and brown patch at the base of the lower mandible, and the feet black.

'It frequents more open country than the Jungle-Hornbills, usually along the river-banks and is much less noisy. It is usually met with in parties of five or six, and the flight, though less laboured, is rarely sustained for as long as that of the larger species.'

158. **Dichoceros bicornis,** (Linn.)

Dichoceros bicornis, *Bonhote*, p. 70.

♂ (head only). Biserat, Jalor. July.

The Homrai Hornbill.

'Three species of large Hornbills were not uncommon in the jungles round Bukit Besar, but I did not consider it worth while spending much time in hunting them.'

The species seen included *Rhinoplax vigil*, the Helmet Hornbill, and *Buceros rhinoceros*, the Rhinoceros Hornbill. The habits of all are very similar. They fly in flocks varying from six to as many as fifteen individuals, using their wings with slow measured strokes, the rush of air through the primaries making a noise which may perhaps be compared to the distant sound of a traction engine toiling up a hill. As soon as they alight on a tree, they give vent to a series of harsh discordant screams, but *Rhinoplax vigil* has, in addition, a sharp staccato note which has given rise to the Malay legend that the bird was once a man, who, becoming enraged with his mother-in-law started to chop through the posts supporting her house, and was thereupon turned into the bird, whose notes represent the blows of the axe.

'Skulls of *Rhinoplax vigil* command a high price in the Peninsula, as much as five or ten dollars being asked and obtained for them. Rings made out of the dense frontal portion of the casque are reputed to act as talismans, turning green when dipped into a poisoned liquid.'

UPUPIDAE

159. **Upupa indica,** Reichenb.

Upupa indica, *Bonhote*, p. 68.

♀ ad.	Patani.	10th June.	(No. 173)
♂, ♀ ad.	Nawngchik.	27th and 29th November.	(Nos. 479, 491)

The Indian Hoopoe has the iris hazel or chestnut, the bill black, horn-coloured at the base, and feet brownish-black.

'Exceedingly local in the Patani States, and always met with in open sandy country near the coast.'

MEROPIDAE

160. Merops sumatranus, Raffl.

Merops sumatrensis (*sic*), *Bonhote*, p. 69.

♂ ad.	Patani.	13th and 15th June.	(Nos. 183, 184)
♂ ad.	Biserat, Jalor.	2nd and 3rd July.	(Nos. 229, 230, 231, 343, 444)
♂, ♀ ad.	Sungkei, South Perak.	7th and 11th February.	

In the Sumatran Bee-eater the iris is red and the bill and feet black.

161. Merops philippinus, Linn.

Merops philippinus, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 71 (1892).

♂, ♀ ad.	Patani.	13th and 15th June.	(Nos. 185, 192)
♀ ad.	Nawngchik.	29th and 30th November.	(Nos. 492, 495)

The Blue-tailed Bee-eater has the iris red and the bill and feet black.

'This bird was breeding in great numbers in the banks of the Perak River, near the Siamese border, in the month of April.' N.A.

162. Melittophagus swinhoei, (Hume)

Merops leschenaulti swinhoei, *Hartert*, p. 544.

♂ ad.	Patani.	15th June.	(No. 191)
♂ ad.	Nawngchik.	28th November.	(No. 481)

The Chestnut-headed Bee-eater has the iris red and the bill and feet black.

'These three species of Bee-eaters, which are collectively known as *Berek-berek*, are common throughout the Peninsula in open country and round rice-fields. *Nyctiornis amicta*, on the other hand, the only other species of Malayan Bee-eater, is exclusively a high-forest bird, which on the east coast of the Peninsula does not seem to range as far north as Patani, though common in Selangor and Perak.'

CORACIIDAE

163. Coracias affinis, McClell.

Coracias affinis, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 13 (1892).

♀ ad.	Nawngchik.	27th November.	(Nos. 477 and 478)

The Burmese Roller has the iris dark hazel, the bill black, and the feet yellowish-green.

'The birds were probably on migration, as this Roller was abundant in the Patani district in November and December, but not seen at any other time of the year.' N.A.

164. Eurystomus orientalis, (Linn.)

Eurystomus orientalis, *Bonhote*, p. 68.

♂, ♀ ad.	Patani.	30th May.	(Nos. 138 and 139)
♂, ♀ ad.	Biserat, Jalor.	5th July and 16th October.	(Nos. 247, 447)
♂ ad.	Jambu, Jhering.	10th and 12th June.	(Nos. 166, 180, and 181)

The Non-migratory Broad-billed Roller has the iris brown, the bill vermilion, black at the tip, and the feet coral-red.

165. Eurystomus calonyx, Hodgs.

Eurystomus calonyx, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 38 (1892).

♀ ad.	Patani.	2nd October.	(No. 430)

The Migratory Broad-billed Roller has the iris hazel, the bill dark red, blackish at the tip, and the feet coral-red.

ALCEDINIDAE

166. Halcyon smyrnensis, (Linn.)

Halcyon smyrnensis fusca (Bodd.), *Bonhote*, p. 69 ; *Hartert*, p. 543.

♂, ♀ ad.	Ban Sai Kau.	26th April, 19th May.	(Nos. 13, 111)
♂ imm.	Rhaman, near Biserat.	19th July.	(No. 296)

The White-breasted Kingfisher has the iris brown or chestnut, the bill dark coral-red, and the feet coral-red.

167. Halcyon pileatus, (Bodd.)

Halcyon pileatus, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 229 (1892).

♀ imm.	Kampong Jalor.	29th October.	
♂ ad.	Jeram Kawan, South Perak.	16th February.	(Nos. 675, 676)

In the Black-capped Kingfisher the iris is dark brown, the bill dark vermilion, and the feet coral-red.

168. Halcyon coromandus, (Lath.)

Halcyon coromandus, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 217 (1892).

♀ ad.	Patani.	3rd October.	(No. 439)

The Ruddy Kingfisher has the iris dull brown, the bill vermilion, and the feet coral.

169. Halcyon humei, Sharpe.

Halcyon humii, *Bonhote*, p. 69 ; *Hartert*, p. 543.

♂ ad.	Patani.	21st June.	(No. 207)
♂ ad. et. imm.	Jambu, Jhering.	5th and 7th June.	(Nos. 152, 157, 159)
♀ ad. et. ♂ imm.	Nawngchik.	29th and 30th November.	(No. 496)

Hume's Kingfisher has the iris brown, the bill black, with the basal part of the lower mandible white, and the feet brownish-black.

170. Carcineutes pulchellus, (Horsf.)

Carcineutes pulchellus, *Sharpe*, *P.Z.S.*, 1886, p. 352.

♂ ad. Bukit Besar, Nawngchik. 2,500 feet. 11th May.

The Banded Kingfisher has the iris brown, the bill black, whitish at the tip and on the lower part of the under mandible, and the feet greenish-white.

171. Ceyx tridactyla, (Pall.)

Ceyx tridactyla, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 174 (1892).

♀ ad. Bukit Besar, Nawngchik. 5th September. (No. 382)

The Indian Three-toed Kingfisher has the iris brown, the bill vermilion, and the feet pinkish-vermilion.

172. Alcedo meninting, Horsf.

Alcedo meninting, *Hartert*, p. 543.

♀ ad. Biserat, Jalor. 3rd August. (No. 330)

The Malayan Kingfisher has the iris dark brown, upper mandible black, the lower orange-red with a yellowish tinge towards the tip, and the feet bright coral-red.

173. Alcedo ispida, Linn.

Alcedo ispida, *Bonhote*, p. 69.

♀ ad. Jeram Kawan, South Perak. 14th February. (No. 677)

In the Common Kingfisher the iris is brown, the bill black above, coral beneath, and the feet coral.

174. Pelargopsis fraseri, Sharpe.

Pelargopsis fraseri, *Bonhote*, p. 69.

♂, ♀ ad.	Patani.	30th May and 10th October.	(Nos. 141, 444)
♂ ad.	Nawngchik.	29th November.	
♂ ad.	Ban Sai Kau.	20th May.	(No. 118)
♀ ad. et imm.	Biserat.	16th and 18th July.	(Nos. 281, 293)

The Malayan Stork-billed Kingfisher has the iris brown, the bill deep lake-red, the inside of the mouth rich orange, and the feet red.

PSITTACIDAE

175. Loriculus galgulus, (Linn.)

Loriculus galgulus, *Bonhote*, p. 76 ; *Hartert*, p. 542.

♂ imm. Biserat, Jalor. 12th and 16th July. (No. 272, 284)
♂ ad. Sungkei, South Perak. 9th February. (No. 635)

The Malayan Loriquet has the iris dark brown, the bill blackish, and the feet plumbeous-green.

176. Psittinus malaccensis, (Lath.)

Psittinus incertus (Shaw), *Bonhote*, p. 76.
Psittinus malaccensis, *Hartert*, p. 542.

♂, ♀ ad. Biserat, Jalor. 6th July and 15th October. (No. 252)

The Little Malayan Parrot has the iris red, the upper mandible red, the lower greenish, and the feet greenish.

BUBONIDAE

177. Photodilus badius, (Horsf.)

Phodilus badius, *Sharpe*, *Cat. B. Brit. Mus.* ii, p. 309 (1875).

♀. Jeram Kawan, South Perak. 13th February. (No. 658)

The Bay-Owl has the iris sooty-black, the bill pinkish-horn, and the feet whitish-horn.

'Shot in deep jungle sitting on a dead branch with its body pressed close to the trunk of the tree.'

178. Syrnium seloputo, (Horsf.)

Syrnium sinense, *Sharpe*, *Cat. B. Brit. Mus.* ii, p. 261 (1875) ; *Bonhote*, p. 58.
Syrnium seloputo, *Blanford*, *Faun*, *Brit. India*, *Birds* iii, p. 278 (1895).

♂, ♀ ad. Ban Sai Kau. 18th September. (Nos. 397, 398)
♀ ad. Biserat, Jalor. 8th July. (No. 254)

The Malayan Wood-Owl has the iris yellow, the bill bluish-horn, paler at the base, and the feet grayish.

'Common in orchards and gardens round the rice-fields.'

179. Ninox scutulata, (Raffl.)

Ninox scutulata, *Grant*, *Ibis*, 1896, p. 111.

♂ ad. Biserat, Jalor. 20th July. (No. 297)

The Brown Hawk-Owl has the iris chrome-yellow, the bill bluish-horn, the cere green, and the feet yellow.

180. **Ketupa ketupa**, (Kaup.)

Ketupa javensis (Less.), *Bonhote*, p. 58.

♀ ad. et. imm.	Ban Sai Kau.	25th May.	(Nos. 135, 136)
♀ ad.	Biserat, Jalor.	8th July.	(No. 257)
♂ imm.	Kampong, Jalor.	20th November.	(No. 475)

Adult examples of the Malayan Fish-Owl with the spotting on the upperparts nearly obsolete have only three light buff bars on the middle tail-feathers, while in the more spotted immature birds there are five caudal bands. Iris orange, bill bluish-horn, feet dull yellow.

'Very common in similar situations to *Syrnuim seloputo*, roosting during the day in the durian and mangosteen trees. The stomach of one bird which I examined contained a large rat and several small fish and crustaceans.

'This Owl also feeds largely on the big aquatic Bug, *Amorgus indicus*.' N.A.

PANDIONIDAE

181. **Polioaëtus ichthyaëtus**, (Horsf.)

Polioaëtus ichthyaëtus, *Bonhote*, p. 58.

♂ ad. et. imm.	Tanjong Patani.	27th September and 6th October.	(Nos. 400, 440)

The Grey-headed Fishing-Eagle has the iris pale yellow, the bill and cere lead-colour, darker on the culmen, and the feet yellowish-white.

'Very abundant on the seaward face of Tanjong Patani, together with *Haliaëtus leucogaster* and *Haliastur intermedius*.'

FALCONIDAE

182. **Microhierax fringillarius**, (Drap.)

Microhierax fringillarius, *Bonhote*, p. 58 ; *Hartert*, p. 541.

♂ ad.	Ban Sai Kau.	17th September.	(No. 394)
♀ imm.	Biserat, Jalor.	15th July.	(No. 280)
♂ imm.	Mabek, Jalor.	25th July.	(No. 316)
♀ ad.	Sungkei, South Perak.	8th February.	(No. 629)
♀ ad.	Gedong, South Perak.	8th January.	(No. 507)

The Black-legged Falconet has the iris yellow or dark hazel, and the bill and feet black.

'The *Lang-belalang* or Grasshopper-hawk is widely spread throughout the Peninsula in suitable localities, frequenting by preference the edges of rice-fields and recently burnt jungle.

'I have watched a pair sitting at the end of a blackened branch and darting out at the insects that flew past.' N.A.

183. **Haliastur intermedius,** Gurney.

Haliastur indus, *Bonhote* (nec Bodd.), p. 58.

♀ ad. et. ♂, ♀ imm.	Patani.	22nd June and 2nd October.	(Nos. 203, 426-428)
♀ ad.	Ban Sai Kau.	7th and 18th September.	(Nos. 383, 396)
♀ ad.	Mabek, Jalor.	26th July.	(No. 323)
♀ imm.	Jambu, Jhering.	5th June.	(No. 153)

The Malayan Brahminy Kite has the iris yellow, the bill bluish-horn, yellowish towards the cere, and the feet dull yellow.

'Very abundant on the coast, and occurring wherever there are large stretches of rice-land, but found much more sparingly towards the interior of the Peninsula.'

184. **Spizaëtus alboniger,** (Blyth)

Spizaëtus alboniger, *Sharpe, Cat. B. Brit. Mus.* i, p. 271 (1874).

♂ imm.	Gedong, South Perak.	7th January.	(No. 500)

The immature of BLYTH's Hawk-Eagle has the iris whitish-yellow, the bill and cere lead-blue, and the feet chrome-yellow.

185. **Spizaëtus limnaëtus,** (Raffl.)

Spizaëtus limnaëtus, *Sharpe, P.Z.S.*, 1887, p. 433.

♀ ad.	Kampong Jalor.	17th November.	(No. 473)

The Changeable Hawk-Eagle has the iris brown, the bill lead-colour, and the feet cadmium-yellow.

186. **Spilornis bacha,** (Daud.)

Spilornis bacha, *Sharpe, P.Z.S.*, 1887, p. 433.
Spilornis cheela, *Bonhote* (*nec* Lath.), p. 57.

♂ ad.	Ban Sai Kau.	19th May.	(No. 102)
♀ ad.	Biserat, Jalor.	26th July, 21st October.	(No. 452)

These specimens belong to the larger, high-ground, darker form of Crested Serpent-Eagle, of which the typical examples are from Java.

187. **Spilornis pallidus,** Walden.

Spilornis bacha, *Hartert*, p. 541.

♂ ad.	Gedong, South Perak.	9th January.	(No. 513)

The above adult male represents the smaller and paler low-ground form, originally described from Borneo. It has the iris orange, the cere pale chrome-yellow, the bill bluish-horn, darker at the tip, and the feet dull yellow.

VULTURIDAE

188. **Pseudogyps bongalensis,** (Gmel.)

Pseudogyps bengalensis, *Sharpe*, *Cat. B. Brit. Mus.* i, p. 11 (1874).

♀ ad. Patani. 10th June.
Imm. Kampong Jalor. 2nd November. (No. 465)

The Indian White-backed Vulture has the iris black, the naked skin of the head yellowish-green, and the feet black.

189. **Otogyps calvus,** (Scop.)

Otogyps calvus, *Sharpe*, *Cat. B. Brit. Mus.* i, p. 14 (1874).

♂ ad. Biserat, Jalor. 6th August.
♂ ad. Kampong Jalor. 30th October. (No. 464)

The Black or Pondicherry Vulture has the iris creamy-yellow, the bare skin on the head and neck red mottled and dusky, the bill black, and the feet dull red.

PHALACROCORACIDAE

190. **Phalacrocorax carbo,** (Linn.)

Phalacrocorax carbo, *Hartert*, p. 540.

♂ ad. et ♀ juv. Patani. 16th August and 2nd October. (Nos. 336, 429)

In the common Cormorant the *adult male* has the iris dark emerald-green, the gular region bright chrome, the bill whitish-horn, and the feet black.

The young female has the iris greyish-green, the bill yellowish-horn, the bare skin cadmium-yellow, and the feet black.

ANATIDAE

191. **Dendrocycna javanica,** (Horsf.)

Dendrocycna javanica, *Bonhote*, p. 81.
Dendrocygna javanica, *Hartert*, p. 541.

♀ ad. Patani. 22nd June. (No. 206)

The Whistling Tree-Duck has the iris brown, the eyelids yellow, the bill dark greenish-horn, and the feet black.

CICONIIDAE

192. **Dissura episcopus,** (Bodd.)

Dissura episcopus, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 294 (1898).

♀ ad. Bayu, Jalor. 8th July. (No. 256)
♀ ad. Kampong Jalor. 30th October. (No. 461)

The White-necked Stork has the iris brown, the bill reddish, darker at the base, and the feet crimson-lake.

Dr. REICHENOW (cf. *Vögel Afr.* 1, p. 347 (1901)) has pointed out that African examples of this genus belong to a distinct species *D. microscelis* (G. R. GRAY), which had been regarded by most authors as synonymous with the present species. A third species, *D. stormi* (BLAS.), found in Borneo, has also been described as *D. mortoni*, GRANT.

ARDEIDAE

193. Ardetta cinnamomea, Gmel.

Ardetta cinnamomea, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 236 (1898).

♂ vix. ad. Patani River. 22nd April. (No. 6)

The Chestnut Bittern has the iris brownish-yellow, with a white ring round pupil, and the feet yellowish-green.

'Snared by the natives among high reeds.'

194. Bubulcus coromandus, (Bodd.)

Bubulcus coromandus, *Bonhote*, p. 80.

♂, ♀ imm. Kampong, Jalor. 16th and 17th November. (Nos. 471, 472)

The Cattle-Egret has the iris yellowish-white, bill and feet chrome-yellow, and the feet black.

'Very abundant on flooded rice-fields in the above locality, suddenly appearing with the bursting of the monsoon. Scarce and sporadic during the dry season from April to October. Malay name, *Bangau*.'

195. Ardeola grayi, (Sykes)

Ardeola grayi, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 207 (1898).

♀ imm. Nawngchik. 30th November.

The Pond-Heron has the iris chrome-yellow, and the feet greenish-yellow.

'Consorting with *Bubulcus coromandus* on flooded meadows at the commencement of the wet season.'

196. Butorides javanica, (Horsf.)

Butorides javanica, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 177 (1898).

Imm.	Patani River.	22nd April.	(No. 5)
♀ imm.	Jambu, Jhering.	6th June.	(No. 162)

The Little Green Heron has the iris chrome-yellow, the bill black, with the lower mandible, except the tomia greenish-yellow, the loral space chrome-yellow, the feet greenish in front, and yellowish behind.

'Not uncommon among the mangroves of the tidal creeks, where it was very difficult to discern on account of its colours harmonizing so exactly with the surroundings. In its normal attitude of rest this bird stands with its bill pointing vertically upwards, making its whole outline as linear as possible.'

197. **Demiegretta sacra,** (Gmel.)

Demiegretta sacra, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 137 (1898).

♀ ad. (white form). Kampong Datoh. 3rd October. (No. 437)

The Eastern Reef-Heron has the iris whitish, the upper mandible and tip of lower black, the remainder yellowish-green, the lores yellowish-green, and the feet sage-green.

'Procured on the mud among mangroves.'

198. **Garzetta garzetta,** (Linn.)

Garzetta garzetta, *Sharpe*, *Cat. B. Brit. Mus.* xxvi, p. 118 (1898).

♂, ♀ ad. Jambu, Jhering. 6th June. (Nos. 154, 155)

In the little Egret the iris is yellow, the lores greenish-yellow, the bill black, the base of the lower mandible bluish-white, the tarsi black, and the feet pale greenish-yellow.

'From a flock of nine or ten, feeding on the mud-flats of the estuary at low tide.'

CHARADRIIDAE

199. **Gallinago stenura,** (Bonap.)

Gallinago stenura, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 619 (1896).

♀ ad. Ban Sai Kau. 18th September. (No. 392)

The Pin-tailed Snipe has the iris hazel, the bill blackish-brown, yellowish at the base, and the feet greenish-yellow.

'Snipe arrived in the Patani States during the second week in September, and were extraordinarily abundant during the two succeeding months, large numbers of them being killed by flying against the recently erected telephone wires.'

200. Tringa minuta, (Leisl.)

Limonites minuta, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 538 (1896).

♂, ♀ ad. Tanjong Budi, Patani. September and October. (Nos. 406, 416, 435)

The Little Stint has the iris, bill, and feet blackish.

201. Tringa platyrhyncha, Temm.

Limicola platyrhyncha, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 612 (1896).

♀ ad. Kampong Budi. 29th September. (No. 418)

The Broad-billed Sandpiper has the iris dark brown, the bill black, yellowish at the base, and the feet greenish-brown.

202. Tringa subarquata, Güldenst.

Ancylochilus subarquatus, *Sharpe*, *Cat. B. Brit. Mus.*, xxiv, p. 586 (1896).

♀ ad. Patani River. 24th September. (No. 409)

The Curlew-Sandpiper has the iris, bill, and feet black.

203. Terekia cinerea, (Güldenst.)

Terekia cinerea, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 474 (1896).

♀ ad. Kampong Budi. 2nd October. (Nos. 429 ? and 434)

The Terek Sandpiper has the iris hazel, the bill black, yellow at the base, and the feet yellowish.

204. Aegialitis dubia, (Scop.)

Aegialitis dubia, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 263 (1896).

♀ ad. Kampong Jalor. 4th November. (No. 466)

The Little-ringed Plover has the iris dark, the bill black, yellow at the base, and the feet yellowish.

205. Aegialitis mongolicus, (Pall.)

Ochthodromus mongolus, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 223 (1896).

♂ imm. Patani. 2nd October. (No. 481)
♂, ♀ imm. Tanjong Budi. 22nd and 24th September. (Nos. 402, 408, 417)

Immature specimens of the Lesser Sand-Plover have the iris dark hazel and the bill and feet black.

206. Charadrius dominicus, Müll.

Charadrius dominicus, *Bonhote*, p. 79.

♀ imm. Tanjong Budi, Jhering. 23rd September. (No. 404)
♂ ad. Kampong Jalor. 5th November. (No. 470)

The Eastern Golden Plover has the iris dark hazel, the bill black, and the feet greenish-lead colour.

207. Strepsilas interpres, (Linn.)

Arenaria interpres, *Sharpe*, *Cat. B. Brit. Mus.* xxiv, p. 92 (1896).

♂, ♀ imm. Tanjong Budi, Jhering. 22nd and 23rd September. (Nos. 401, 405)

The Turnstone has the iris dark brown, the bill black, reddish-brown at the base, and the feet yellowish-orange.

'Shore-birds become abundant on the coasts of the Peninsula towards the end of August, rapidly increasing in numbers during September and October. In addition to the species enumerated above, Curlews and the Burmese Wattled Plover (*Sarcogrammus atrinuchalis*) were very abundant on Tanjong Patani during the first few days of October.'

LARIDAE

208. Sterna sinensis, Gmel.

Sterna sinensis, *Bonhote*, p. 80.

♂, ♀ ad. Tanjong Budi, Patani. 16th August. (No. 337, 338)

The White-shafted Little Tern has the iris dark brown, the bill chrome-yellow, tipped with greenish-black, and the feet chrome.

'In addition to the above species, *Sterna bergii* and a gull resembling *L. ridibundus* in winter plumage were noted off Tanjong Patani.'

HELIORNITHIDAE

209. Heliopais personata, (Gray)

Heliopais personata, *Bonhote*, p. 79.

♂ ad. Jeram Kawan, South Perak. 13th February. (No. 662)

The Masked Finfoot has the iris chrome, the bill bright yellow, and the feet pale apple-green.

'Rare as this species is in collections, it is by no means uncommon in suitable localities throughout the Peninsula. It frequents the upper reaches of rivers where the current is strong and the water is clear, and is very shy. When disturbed it only takes to flight with the greatest reluctance, and then for a very short time. Normally it escapes down stream, using its wings as paddles and with his head bent back, very much in the attitude of the Snake-bird, (*Plotus melanogaster*), which affects similar situations. If the opportunity is afforded it, it takes refuge beneath the overhanging banks.'

'The Malay name is *Itek ayer* (Water-Duck).' N.A.

RALLIDAE

210. Gallicrex cinerea, (Gmel.)

Gallicrex cinerea, *Bonhote*, p. 79.

A male of the Kora or Water-cock in the blackish summer-plummage bears no particulars.

'The *Ayam-ayam* or 'Hen' is very local in its distribution, but common wherever found. The present specimen was obtained near Patani.

211. Amaurornis phoenicura, (Forst.)

Amaurornis phoenicura, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 156 (1894).

♀ ad.	Patani.	22nd April.	(No. 4)
♂ imm.	Kampong Jalor.	23rd November.	(No. 476)
♂ ad.	Sungkei, South Perak.		(No. 647)

The White-breasted Water-Hen has the iris dark sienna-brown, the bill greenish-olive, the base of the upper mandible and frontal shield crimson, and the feet yellow with a gamboge tinge.

'Common along river-banks and in swamps throughout the Peninsula.'

212. Amaurornis fuscus, (Linn.)

Limnobaenus fuscus, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 146 (1894).

♂ ad. Patani. 22nd April. (No. 3)

The Ruddy Crake has the iris and eyelid crimson, the bill leaden-black, inclining to greenish, the feet brick-red, brighter above the tibio-tarsal joint, the claws and hinder aspect of tarsus darker.

'Snared by Malays among the reeds at the mouth of the Patani River.'

213. Rallina superciliaris, (Eyton)

Rallina superciliaris, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 76 (1894).

♂ ad. G. Berumban, Perak. 6,000 feet. 28th January. (No. 603)

'The Banded Crake was collected by Sakais.'

COLUMBIDAE

214. Chalcophaps indica, (Linn.)

Chalcophaps indica, *Bonhote*, p. 77 ; *Hartert*, p. 540.

♂, ♀ ad. Biserat. 2nd July. (Nos. 226, 227, 228)

The Bronzed-winged Dove has the iris dark hazel, the orbital skin dark lake, the bill vermilion, orange towards the tip, darker at the base, and the legs purplish-lake.

'Met with everywhere throughout low-country jungle, and trapped by means of a pigeon call. It is extensively used as food. Malay name, *Punai tana*.'

215. **Geopelia striata,** (Linn.)

Geopelia striata, *Salvad.*, *Cat. B. Brit. Mus.* xxi, p. 458 (1893).

♂, ♀ ad.	Patani.	20th June.	(Nos. 204, 340)
♂, ♀ ad.	Ban Sai Kau.	16th and 17th September.	(Nos. 388, 393)

The Barred Ground-Dove has the iris brown, the bill lavender, and the feet lake-red.

'Found in similar situations to the preceding, but not so common.'

216. **Turtur tigrinus,** (Temm. and Knip.)

Turtur tigrinus, *Bonhote*, p. 77.
Turtur tigrina, *Hartert*, p. 540.

♂ ad.	Patani.	10th June.	
♀ ad.	Ban Sai Kau.	16th September.	(No. 387)
♂, ♀ ad.	Biserat, Jalor.	1st and 6th July.	(Nos. 224, 250, 251)
♂ imm.	Jambu, Jhering.	9th June.	(No. 178)

The Malay Spotted-Dove has the iris brown or orange, the bill black, and the feet coral-pink.

'Commonest near the coast in open sandy localities; one of the favourite cage birds of the Malays.'

217. **Osmotreron olax,** (Temm.)

Treron olax, *Bonhote*, p. 77; *Hartert*, p. 539.

♂ ad.	Jeram Kawan, South Perak.	13th February.	(No. 655)
♂ ad.	Bidor, South Perak.	3rd February.	(No. 611)
♂ ad.	Gedong, South Perak.	7th January.	(Nos. 501, 502)

The Little Malayan Green Pigeon has the outer ring of the iris terra-cotta-red, the inner white, the bill yellowish-green, and the feet bright coral-red.

'This species and *O. vernans* are common everywhere throughout the Peninsula, though their place is largely taken by *O. fulvicollis* in the mangroves on the coast.'

218. Osmotreron vernans, (Linn.)

Osmotreron vernans, *Bonhote*, p. 76.

♂, ♀ ad. Patani. 10th June. (Nos. 170, 171)
♂, ♀ ad. et ♂ imm. Biserat, Jalor. June, July, and October. (Nos. 215, 216, 217, 238, 239, 454)

In the Pink-necked Green Pigeon the iris is yellow, with an orange ring round the pupil, the bill bluish-horn, paler at the tip, and the feet deep lake-pink.

219. Treron nipalensis, (Hodgs.)

Treron nipalensis, *Salvad.*, *Cat. B. Brit. Mus.* xxi, p. 34 (1893).

♂, ♀ ad. Sungkei, South Perak. 11th February. (Nos. 648, 649)

The Thick-billed Green Pigeon has the iris pale cream-colour, the bill pale yellow, the base of the lower mandible crimson, and the feet bright coral-red.

220. Butreron capellei, (Temm.)

Butreron capellei, *Bonhote*, p. 76 ; *Hartert*, p. 539.

♂ ad. Mabek, Jalor. 24th July. (No. 315)

The Large Thick-billed Green Pigeon has the iris yellowish-brown, the bill greenish-yellow, and the feet bright yellow.

'Somewhat rare and shy, feeding on the tops of very high trees.'

TURNICIDAE

221. Turnix taigoor, (Sykes)

Turnix taigoor, *Bonhote*, p. 78 ; *Hartert*, p. 539.

♀ ad. Ban Sai Kau. 26th April. (No. 13)

The Bustard-Quail has the iris red, and the bill and feet pale plumbeous.

'Fighting quails are much kept by the Malays, more especially in the northern parts of the Peninsula. Both this and the Painted Quail (*Excalfactoria chinensis*) are common wherever there are wide stretches of *lalang* grass.'

PHASIANIDAE

222. Gallus gallus, (Linn.)

Gallus gallus, *Bonhote*, p. 78.

♀ ad. Biserat, Jalor. 2nd July. (No. 232)
♂ ad. Sungkei, South Perak. 9th and 10th February. (Nos. 632, 640)

The Jungle-Fowl has the iris yellowish-brown, the wattles red, the bill pale horn colour, and the feet pale lead colour.

'Everywhere abundant, and interbreeding with the domestic poultry.'

223. Polyplectron malaccensis, (Scop.)

Polyplectron bicalcaratum, *Grant, Cat. B. Brit. Mus.* xxii, p. 354, (1893); *Bonhote*, p. 78.

Polyplectron malaccensis, *Hartert*, p. 538.

♂, ♀ ad. Lower Batang Padang, South Perak. 29th January. (Nos. 605, 608)

Dr. HARTERT is no doubt right in maintaining that *P. malaccensis* is the correct name for the Malayan Peacock-Pheasant.

'Usually inhabiting the densest jungle, and even more shy than the Argus. Malay name, *Kuang chermin* (Mirror Argus-Pheasant), alluding to the tail spots.'

224. Pavo muticus, Linn.

Pavo muticus, *Bonhote*, p. 78; *Hartert*, p. 538.

♂ ad. et imm. Mabek, Jalor. 22nd July. (Nos. 299, 300)

The Burmese Pea-fowl has the iris dark hazel, the anterior portion of the bare face lavender-blue, the hinder portion from the gape upwards pale chrome-yellow, the bill black, horn-coloured at the tip, and the feet black.

'Exceedingly rare on the western side of the Peninsula, but very abundant in Pahang and the more inland districts of the Patani States, and frequenting low jungle near rivers. Malay name, *Merak* (probably onamatopoetic).'

225. Argusianus argus, Linn.

Argusianus argus, *Bonhote*, p. 78; *Hartert*, p. 538.

♂ ad. Rhaman. 19th July. (No. 295)

The Argus has the iris greenish-hazel, the naked skin of the head blue, the bill whitish-horn, and the feet pale coral-pink.

'Common throughout the Peninsula in old jungle, but apparently does not frequent the swampy tracts near the coast. It is especially fond of the ridges of the hills, where spaces cleared by the cocks as "showing-off" grounds are often to be met with. The natives told me that this peculiarity was taken advantage of by them in trapping the males, who are very particular in removing any dead leaves or twigs from their grounds. A strip of bamboo sharpened on the lower edge is firmly pegged down in the form of a hoop in the centre of the space, and the bird in its efforts to remove it places its head beneath the sharpened edge and so decapitates itself. I give the story for what it is worth. By the Sakai the Argus-Pheasant is not unfrequently tamed, and hens may often be seen among their domestic poultry. The Malay name is *Burong kuang*.'

REPORT ON THE CRUSTACEA

BY

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ASSISTANT LECTURER AND DEMONSTRATOR IN ZOOLOGY AT UNIVERSITY COLLEGE, DUNDEE

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THE collection is small and, though supplying representatives of many of the great groups of Crustacea, presents in consequence few points of interest. One new and characteristic species of *Potamon* is described, and attention may be drawn to the curious association of the young of *Neptunus pelagicus* with a *Rhizostoma*.

1. **Doclea gracilipes,** Stimpson

Alcock, *Journ. As. Soc. Bengal*, vol. lxiv, pt. 2, p. 229 (1895).

1 ♂, 4 ♀'s. Patani Bay.

2. **Naxia hystrix,** Miers

Chall. Brachyura, p. 61 (1886).

Patani Bay.

The tips of the rostrum in this female example are broken off, but I have little doubt that my identification is correct. The spines generally are somewhat less sharp than in the typical form.

3. **Hyastenus planasius,** Ad. and White

Alcock, *J.A.S.B.*, vol. lxiv, pt. 2, p. 212 (1895).

1 small ♂. 1½ miles E.S.E. of Cape Patani. 10 fath.

'Hard clayey mud, with many dead shells.'

4. **Neptunus pelagicus,** Linn.

Alcock, *J.A.S.B.*, vol. lxviii, pt. 2, p. 34 (1899).

1 ♀. Patani Bay.

Much damaged.

1 ♂. Jambu River.

'From ventral surface of large Rhizostomous medusa.'

Several young. Estuary of Jambu River.

'From ventral surface of various medusae.'

I am not aware that the association of this species with medusae has been previously noted, and the discovery is of interest. Seeing to what a large size *N. pelagicus* grows the association can only be temporary, and it would be interesting to know if it is only accidental in these cases, or, as is more probable, a regular phenomenon bound up with some particular purpose.

5. **Neptunus sanguinolentus,** Herbst.

Alcock, *J.A.S.B.*, vol. lxviii, pt. 2, p. 33 (1899).

1 ♀. Patani Bay.

6. **Charybdis (Goniosoma) callianassa,** Herbst.

Alcock, *J.A.S.B.*, vol. lxviii, pt. 2, p. 57 (1899).

1 ♂. Patani Bay.

7. **Thalamita danae** var. **stimpsoni,** A.M.E.

Alcock, *J.A.S.B.*, vol. lxviii, pt. 2, p. 79 (1899).

1 young ♂. 1½ mile E.S.E. of Cape Patani. 10 fath.

'Clayey mud with much shelly debris.'

8. **Myomenippe granulosa,** A. M. Edw.

de Man, *Mergui Crust.*, pl. ii, fig. 1, p. 40 (1888).

Patani Bay.

One ♂, with a small *Balanus concavus* on the carapace.

9. **Scylla serrata,** Forskal.

Haswell, *Cat. Austr. Crust.*, p. 79 (1882).

Patani Bay.

One large male.

10. **Potamon (Potamon) peallanum,** Wood-Mason

J.A.S.B., vol. xl, pt. 14, fig. 7, p. 204 (1871).

Bukit Besar. 2,500 feet.
Three adult males and three adult females.
Three young males and two young females.

'From small jungle stream.'

The spines and rugosities are generally less marked in these specimens than in the type. In the young examples the short hairs on the carapace are sufficiently dense to appear almost as a pubescence, and the joints of the legs are banded dark on a lighter background.

11. Potamon (Paratelphusa) improvisum, Lanch. (Fig. 1)

Proc. Zool. Soc., pl. 33, fig. 2, p. 546 (1901)

Mabek, Hulu Jalor.

In the above paper I described this species from a single female specimen. In this collection there are one large male, three small males, and one small female ; and on comparing the large male with the description of the type specimen I note the following differences :—The left hand of the male is much larger than the right, with the hand much swollen, two-thirds as high as long, and with the fingers gaping and hardly crossing at the tips. The first epibranchial tooth (*i.e.*, the one behind the extra-orbital tooth) is blunt and conical, not sharp and conical ; this, however, may be only an individual difference. The external, *i.e.*, lateral portions of the post-frontal crest are just a little more wavy than they appear in the figure (l.c., pl. 33, fig. 2). The branchial regions are markedly excavate. The abdomen may be thus described : The third segment extends proximally between the bases of the legs, and distally becomes only very slightly narrower ; the fourth segment narrows rapidly, its border being somewhat concave ; the fifth segment narrows slightly, while the sixth again slightly expands ; and the seventh, at first becoming narrower, then runs with parallel sides to its rounded termination.

12. Potamon (Paratelphusa) sex-punotatum, sp. nov. (Fig. 2)

1 ♀. Sai Kau, Nawngchik.

From rice-field.

1 ♀. Cape Patani.

Freshwater pool.

In this species there are three epibranchial teeth behind the extra-orbital, the carapace is very convex and marked on the gastric region with six large punctae arranged roughly in a semicircle, and the meropodites of the legs are armed with a sub-distal spine.

Of the lateral teeth the extra-orbital is blunt, the other three sharp ; all of them flattened conical, the second slightly smaller than the rest. The carapace is about one-sixth broader than it is long (43 : 36 mm. and 42 : 34 mm.), covered with distinct and distant punctae, six of which are very large and arranged as in Fig. 2A. The post-frontal crest is distinct and interrupted at a level just inside that of the internal angle of the eye ; the median piece inside this level is only very slightly oblique in a backward direction as it passes outwards, while outside this level the direction of the crest becomes more oblique up to the level of the tips of the eyes, from which point it curves roughly in the arc of a circle with forwardly directed convexity, to join almost, but not quite, the anterior border of the last epibranchial tooth. From the point where the crest takes on a forward direction a distinct groove or suture runs down the steep anterior surface of the crest as far as the base of the extra-orbital tooth. The front is salient, in the one specimen with its anterior edge straight or even very slightly convex, in the other excavate in the middle line so as to give rise to two shallow lateral lobes ; laterally it curves away gradually into the supraorbital border which is thick, and especially so at a point just behind the base of the eye-stalks. None of these ridges—whether teeth, crest, front, or supra-orbital border—are denticulated ; a faint rugosity may be detected here and there with the lens, but generally speaking they are quite smooth. The sub-orbital border, however, is distinctly denticulated.

The impressed line on the ischium of the third maxillipedes lies close to, and practically parallel with, the inner border ; the outer surface of the meri is distinctly excavate. The chelipedes do not present any particularly characteristic features ; the merus is armed with a conical spine near the distal end of its upper border, and the carpus has the usual spine on its inner and upper border, this spine being strong and sharp without any subsidiary spinules at its base.

13. **Sesarma taeniolatum,** White. (Fig. 3)

Alcock, *J.A.S.B.*, vol. lxix, pt. 2, p. 419 (1900).

Four large males. Patani Bay.

The musical ridges form exceedingly prominent short ridges tipped with tubercles.

14. **Sesarma maculata,** de Man.

Weber's, *Zool. Ergebn*, p. 347, pl. 21, fig. 19.
Lanchester, *P.Z.S.*, p. 550, 1901.

A small ♂. Bukit Besar. 2,500 feet.

'From sweep-net among low vegetation near jungle stream.'

A small ♀. Same mountain. 3,500 feet.

'Among bamboo beds at top of hill some distance from water.'

The second epibranchial tooth is absent in the ♀ on the right side, and only represented on the left by a small tubercular prominence. In the ♂ it is present on both sides as a distinct tubercle.

On the base of the movable finger there are only two to three indistinct teeth.

15. **Ocypode ceratophthalma,** Pallas

Alcock, *J.A.S.B.*, vol. lxx, pt. 2, p. 345, 1900.

5 ♂'s and 1 ♀. Patani.

'Live in burrows at high-tide mark.'

16. **Uca annulipes,** Latr.

Alcock, *J.A.S.B.*, vol. lxix, pt. 2, p. 353 (1900).

13 ♂'s. Cape Patani.

17. **Matuta victor,** Fabr.

Alcock, *J.A.S.B.*, vol. lxv, pt. 2, p. 160 (1896).

2 adult ♂'s, 1 young ♂, 3 adult ♀'s. Patani Bay.

Undoubtedly *M. victor*, but the front is not broader than, but exactly the width of, the orbit in every one.

18. **Dorippe facchino,** Herbst.

Alcock, *J.A.S.B.*, vol. lxv, pt. 2, p. 278 (1896).

1 ♂ with anemone, and gastropod operculum interposed, 3 ♂'s. Patani Bay.

'All the specimens had, when taken, a gastropod operculum, with an anemone attached, on their backs. In one case the anemone and the operculum were removed from the living crab, which was placed in a jar of sea-water in which there were several small Rhizostomous medusae. It immediately seized hold of one of these by means of its two posterior legs and, despite the medusa's violent pulsations, held it firmly. An anemone on an operculum from another crab was then placed in the jar. The first crab immediately let go the medusa and took hold of the operculum which fitted closely to its back. All the anemones seen on crabs of the species were identical in form and coloration, and similar ones were not seen in any other position.'—N.A.

19. **Diogenes planimanus,** Henderson

Trans. Zool. Soc. (2), vol. v, p. 416, pl. 39, fig. 5 (1893).

One large and one small specimen. Cape Patani.

In the larger specimen the granules are smaller and flatter in the middle of the palm where the greatest depression occurs, in the smaller they are of equal size ; in both they appear of a pearly nature under the lens.

20. **Diogenes mixtus**, Lanchester.

Proc. Zool. Soc., p. 367, pl. 39, fig. 2 (1902).

Patani Bay.

Four specimens, and one larger with two anemones on the shell.

The most constant, and at the same time the most distinctive, features of this species are the following :—

The length of the inner lobe of the antennal acicle.
The number of granules in the two rows on the carpus.
The extension of the row of granules on the lower finger up to the carpal joint.

The number of granules on the fingers varies here from 27-30, and on the inner row of the palm they reach 12-14. The external row on the palm is always terminated at the finger-joint by two spinous granules placed each in the same transverse line and a little out of the line of those behind ; of these I have only included one in my enumeration. On the lower outer surface ot the palm the spiniform granules tend to disappear.

21. **Clibanarius infraspinatus**, Hilgendorf

de Man, *Mergui Crust.*, p. 237 (1888).

Two specimens. Patani Bay.

22. **Coenobita compressus**, M. Edw.

Ortmann, *Zool. Jahrb. Syst.* v, p. 318 (1892).

1 ♂. Patani Bay.

The granulation on the last two points of the third left leg is confined to the proximal quarter of the penultimate joint.

23. **Palaemon sundaicus**, Heller

Ortmann, *Zool. Jahrb. Syst.* v, p. 719 (1891).

Kuala Mabek, Jalor.

Ten specimens. All small, except one which measures 57 mm. including the rostrum, and which is precisely similar to the smaller specimens except for a certain amount of pubescence on the carpus, the hand, and especially the fingers.

24. **Alpheus brevirostris**, Olivier

de Man, *Mergui Crust.*, p. 261 (1888).

One specimen. Patani Bay.

25. **Squilla raphidea,** Fabr.

Miers, *Ann. Mag. Nat. Hist.* (5) v, p. 27 (1880).

Patani Bay.

Two males, in one of which the left dactylus of the raptorial limbs carries nine spines instead of eight.

26. **Squilla nepa,** Latr.

Miers, t.c., p. 25.

One female. Patani Bay.

'Very shallow water; sand.'

27. **Alima emarginata,** Claus. (Fig. 4)

Abh. d. kön. Ges. Wiss. Göttingen, Bd. vi, p. 42, fig. 33, 1871.

Off Cape Patani.

Caught while dredging on a sandy bottom at four fathoms, but probably really obtained from the surface.

A single specimen of 20 mm. The arrangement of teeth on the edges of the carapace is as follows :—Seven spines on and behind the antero-lateral angle, slightly decreasing in size backwards, then a gap, then three up to and on the postero-lateral angle, and one a little way along the under surface of the large lateral spine.

28. **Balanus amphitrite** var. **communis,** Darwin

Balanidae, p. 240 (1854).

Patani Bay.

A few specimens, of which the shells only are present. It is far from satisfactory to try and identify Balanids from single specimens or from such as lack the opercular valves and the soft parts, especially since we have such variable species existing as the present and *B. tintinnabulum.* The present specimens cannot belong to the latter species, however, since their radii are not porose, and I think it highly probable that I am right in referring them to the equally common *B. amphitrite.*

29. **Balanus concavus,** Brown

Balanidae, p. 225 (1854).

Patani Bay.

One specimen on an oyster shell, and another small one from the carapace of *Myomenippe granulosa.* I have satisfied myself of the identity of this form by a careful examination of the valves and the soft parts, and in so far as there are differences (admittedly slight) between this and the last species, those differences are present here.

30. Ligia exotica, Roux.

Budde-Lund, *Isop. Terr.*, p. 266 (1885).

Four small specimens. Jambu River.

'From mud of mangrove swamp. Malay name, *Gutu prahu* (boat-louse).'

On the Malay name of this animal Mr. ANNANDALE writes me as follows:—'This wood-louse is called "*Gutu prahu*" in the Patani dialect, "*Kutu prahu*" in more correct Malay. At Patani it is also called "*Hibu prahu*," *i.e.*, boat parasite (*lit.* boat mother); but I think that it shares these names with a large earwig which is commonly found on the seashore just above high-tide mark.'

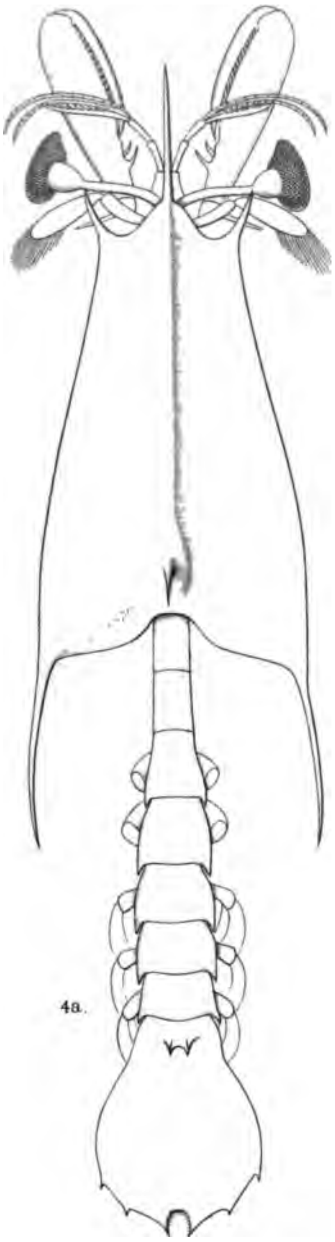
31. Rocinela mundana, Lanchester

Proc. Zool. Soc., p. 378, pl. xxxv, fig. 9 (1902).

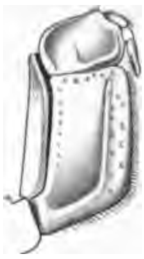
An ovigerous female. Ban Sai Kau.

'From the mouth of a Silurid fish, from pool in rice-fields.'

In my previous description I have said that the anterior legs are unarmed, but this statement is probably wrong as, in this specimen, I find that they are armed. The spines, however, are very small and few in number and only visible under the high power of the microscope. On the tarsi I find two, side by side, subdistally and one subproximally, and three subdistally on the femora; all very short and thick. The apex of the telson is also a little more rounded in this specimen. As my figure shows, the whole body is marked with rather irregular dull-brown pigment areas, giving it a somewhat spotted appearance. The type was also procured in freshwater, from the gills of a skate.



4a.



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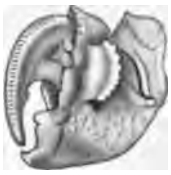

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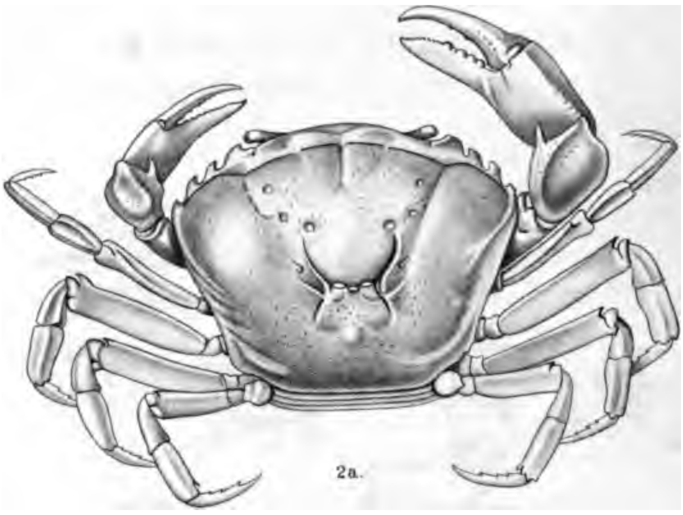

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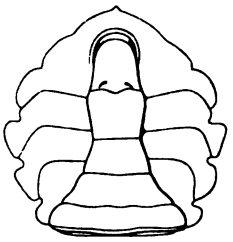

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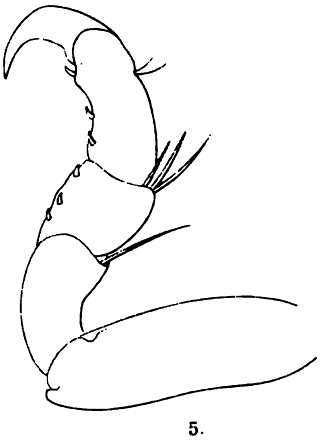

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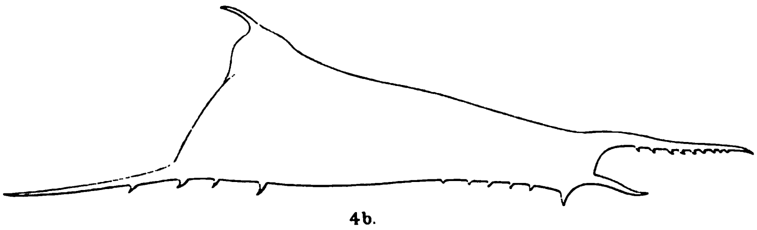

4b.

F. Wilson, Cambridge

1. Potamon improvisum. 2 Potamon sex-punctatum

2. Sesarma taeniolatum 4. Alima emarginata.

5 Rocinela mundana.

REPORT ON THE PHYTOPHAGOUS BEETLES

BY

MARTIN JACOBY, F.E.S.

INTRODUCTORY NOTE

THE small number of specimens in our collection, considering the number of species represented, prevents any inference being drawn as to the distribution of the Phytophagous Beetles of the Malay Peninsula. As regards their bionomics also, what we can add amounts to little. One point may be noted—the resemblance between many of the species of the peculiar Dipterous family *Celyphidae* and the small, globular, iridescent blue or purple Phytophaga so abundant in Malaya, belonging to a great number of species but closely similar to one another save in the eyes of a specialist. These little beetles and flies have much in common as regards movements and habits ; but the flies are by far the scarcer. Both shun a bright light or great heat, retiring under the shelter of foliage at mid-day, but emerging to run about on the surface of leaves whenever the air is cool after rain and in the early morning and late afternoon ; both have the same rapid, rather jerky gait; both take to flight with surprising ease, apparently without muscular effort, on the slightest disturbance. The flies may readily be distinguished from the beetle, on examination, by their tongues, which are constantly being applied, seemingly with a sucking action, to the surface of the leaves ; but a casual glance rarely suffices to tell which is which. Some Malayo-Siamese Celyphids, however, have not the deep hues and brilliant iridescence of their more numerous congeners; they, too, are like Phytophaga in shape and movements, but seldom resemble any one species or genus in detail.

It is doubtful whether this is a case of true mimicry, not rather one of adaptive resemblance. Between the *Celyphidae* and many of the Hemipterous family *Pentatomidae* a similar, but not so close, a superficial likeness exists, and in this instance, though the resemblance is less striking to the human eye, the structural convergence is much greater, both fly and bug possessing a false carapace beneath which the functional wings can be concealed and protected. The carapace thus performs the same function as the elytra of a beetle. In both elytra and carapace there is a common production of dark pigment combined with peculiarities of form, which produce iridescence or metallic lustre more or less conspicuously in different instances.

NELSON ANNANDALE

INDIAN MUSEUM, CALCUTTA
April 12, 1905

REPORT ON THE COLEOPTERA PHYTOPHAGA

By MARTIN JACOBY, F.E.S.

PROFESSOR POULTON has placed in my hands for examination a small collection of Phytophagous Coleoptera obtained by Messrs. Annandale and Robinson in the Siamese-Malay States and Perak. Besides a good many species formerly described from the Malay Peninsula or the neighbouring islands, a certain number seem to be new. Of these I have given descriptions in an appendix to this volume, as well as of one or two other species from Borneo in my collection. All the species obtained by the gentlemen named above, except in the case of unique types, are now in the Oxford Museum collection, with duplicates in my own. The types will be presented to the British Museum. The following is a list of the species obtained, with the exception of those of which I am not able to give the names for want of more specimens :—

SAGRINAE

1. Sagra peteli, Lac.

1. Biserat, Jalor. October 24th, 1901. (Nat. coll.)

CRIOCERINAE

2. Lema cyanea, Fabr.

2. Bidor, South Perak. February 20th, 1902.

3. Lema coromandeliana, Lac.

1. Bidor, South Perak. February 20th, 1902.

4. Lema striatopunctata, Lac.

1. Bukit Besar, Nawngchik. May 19th, 1901.

'The hardness of the elytra of this species is noted.'

5. Crioceris impressa, Fabr.

2. Biserat, Jalor. July, 1901.
1. Bukit Besar, Nawngchik. 2,500 feet. July 14th, 1901.

6. Orioceris semipunctata, Fabr.

2. Biserat, Jalor. June 7th, 1901.

7. Crioceris 4-pustulata, Lac.

1. Biserat, Jalor. July 7th, 1901.

'Flying in bright sunshine.'

1. Gedong, South Perak. January 9th, 1902.

CLYTHRINAE

8. Tituboea laportei, Baly

5. Biserat, Jalor. October 14th to 21st, 1901.

'Among shrubs and brushwood and on flowers, early morning and afternoon.'

9. Aspidclopha buquetti, Lac.

2. Mabek, Jalor. July 22nd to 27th, 1901.
2. Biserat, Jalor. May 30th to June 19th, 1901.
1. Patani Town. October 8th, 1901.

'Among low shrubs, flying at mid-day.'

CRYPTOCEPHALINAE

10. Melixanthus bimaculicollis, Jac.

2. Mabek, Jalor. June 23rd, 1901.

'In jungle, morning.'

11. Melixanthus siamensis, Jac. (sp. nov.)

1. Biserat, Jalor. October 20th, 1901.

12. Cryptocepahlus birmanicus, Jac.

2. Mabek, Jalor. June 23rd to 24th.

EUMOLPINAE

13. Aoria bowringi, Baly

2. Bukit Besar, Nawngchik. May, 1901.
1. Ban Sai Kau, Nawngchik. April, 1901.
1. Jeram Kawan, South Perak. February 13th, 1902.

'This species, especially when on the wing, resembles a common Coccinellid very closely. Like most of the Malayan Lady-birds it takes to flight readily.'

14. **Nodostoma aenipenne,** Motsch.

2.	Biserat, Jalor.	October 20th to 23rd, 1901.
1.	Jeram Kawan, South Perak.	February 13th, 1902.

15. **Nodostoma frontale,** Baly

1. Gedong, South Perak. January 7th, 1902.

16, 17. **Nodostoma,** spp.

2. Telôm, Perak-Pahang boundary. 4,000 feet. January 19th to 22nd, 1902.

18. **Cleorina aulica,** Lefèv.

1. Biserat, Jalor. October 24th, 1901.

19. **Cleorina metallica,** Lefèv.

2.	Bukit Jalor, Jalor.	October 31st, 1901.
1.	Biserat, Jalor.	July 4th, 1901.

20. **Colasposoma mutabile,** Baly

1. Gedong, South Perak. January, 1902.

21. **Colaspoides lapertei,** Baly

3.	Mabek, Jalor.		July 22nd to 26th, 1901.
2.	Bukit Besar, Nawngchik.	2,500 feet.	May, 1901.
1.	Biserat, Jalor.		July 4th, 1901.
1.	Bidor, South Perak.		February 3rd, 1902.
1.	Sungkei, South Perak.		February 10th, 1902.
1.	Jeram Kawan, South Perak.		February 12th, 1902.

22. **Colaspoides siamensis,** Jac. (sp. nov.)

1. Biserat, Jalor. June 4th, 1901.

23. **Colospoides annandalei,** Jac. (sp. nov.)

1. Bukit Besar, Nawngchik. 3,000 to 3,500 feet. May 5th, 1901.

24. **Corynodes nitidus,** Fabr.

1. Mabek, Jalor. July 10th, 1901.

25. **Corynodes mouhoti,** Baly

5.	Ban Sai Kau, Nawngchik.	May 20th to 21st, 1901.
2.	Biserat, Jalor.	July 4th to 12th, 1901.
1.	Patani.	August 8th, 1901.

26. Corynodes gibbifrons, Lefèv.

2. Ban Sai Kau, Nawngchik. May 26th, 1901.
19. Biserat, Jalor. June, July, 1901.

'Among low bushes on sandy soil.'

CHRYSOMELINAE

27. Agasta formosa, Hope

1. Bukit Besar, Nawngchik. 2,500 feet. April, 1901.

HALTICINAE

28. Sphaerometopa nigricollis, Jac.

2. Bukit Besar, Nawngchik. 2,500 feet. April, May, 1901.

29. Sebaethe bipustulata, Jac.

1. Bukit Besar, Nawngchik. 3,000 feet. April 29th, 1901.
1. Telôm, Perak-Pahang boundary. 4,000 feet. January 19th, 1902.

30. Sebaethe sumatrana, Jac.

31. Sabaethe lusca, Fabr.

1. Telôm, Perak-Pahang boundary. 4,000 feet. January 19th, 1902.

32. Euphitrea wallacei, Baly

1. Gedong, South Perak. January 7th, 1902.

33. Acrocrypta fraterna, Jac.

4. Bukit Besar, Nawngchik. 2,500 feet. April to September, 1901.

34. Acrocrypta dimidiata, Baly

1. Bukit Besar, Nawngchik. 2,500 feet. May 1st, 1901.

35. Hyphasis fulvicornis, Jac. (sp. nov.)

1. Mabek, Jalor. July 24th, 1901.

'On wing at dusk among low shrubs at edge of jungle.'

36. Podontia 14-punctata, Lac.

1. Biserat, Jalor. October 23rd, 1901.

37. **Podontia affinis**, Grönd.

1. Bukit Besar, Nawngchik. 2,500 feet. May 5th, 1901.
1. Biserat, Jalor. July 14th, 1901.

38. **Haltica**, sp.

4. Kampong Jalor, Jalor. November 20th, 1901.

'In large numbers on the leaf of a *Caladium* growing in water. They were seen to feed on the pupa of a small moth which was wrapped up in a leaf.'

39. **Simaothea laportei**, Baly

1. Jeram Kawan, South Perak. February 12th, 1902.

40. **Sphaeroderma parvula**, Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. May 5th, 1901.

41. **Sphaeroderma**, sp.

1. Biserat, Jalor. July 9th, 1901.

42. **Netomela apicipennis**, Jac. (sp. nov.)

3. Patani. April 24th, 1901.

43. **Irisotra gemella**, Erichs.

2. Biserat, Jalor. June to November, 1901.

'This species is noted as bearing a close resemblance to a small Dipteron of the family Celyphidae (see Introductory Note).'

GALERUCINAE

44. **Oides pectoralis**, Clark

11. Bukit Besar, Nawngchik. 2,500 feet. May, September, 1901.
1. Gedong, South Perak. January 8th, 1902.

45. **Aulacophora rosea**, Fabr.

4. Bukit Besar, Nawngchik. 2,500 to 3,500 feet. May, August, 1901.

46. **Aulacophora coffeae**, Hornst.

1. Telôm, Perak-Pahang boundary. 4,000 feet. January 25th, 1902.

47. **Aulacophora palliata**, Fabr.

1. Sungkei, South Perak. February 10th, 1902.

48. Aulacophora denticornis, Fabr.

1. Gedong, South Perak. January 10th, 1902.

49. Aulacophora intermedia, Jac.

1. Biserat, Jalor. July 11th, 1901.
1. Patani. October 10th, 1901.

50. Aulacophora lewisi, Baly

2. Biserat, Jalor. July 4th, 1901.

51. Aulacophora foveicollis, Küst.

1. Biserat, Jalor. October 15th, 1901.

52, 53. Aulacophora, spp.

1. Biserat, Jalor. October 24th, 1901.
1. Gedong, South Perak. January 8th, 1902.

54. Pseudocophora buquetti, Guer.

17. Bukit Besar, Nawngchik. 2,500 feet. April, May, August, 1901.

55. Pseudocophora sumatrana, Jac.

5. Bukit Besar, Nawngchik. 2,500 feet. May, August, 1901.

56. Pseudocophora basalis, Jac.

1. Bukit Besar, Nawngchik. August 2nd, 1901.

57. Haplosomoides plicata, Alld.

2. Bukit Besar, Nawngchik. 2,500 feet. April 29th, 30th, 1901.

58. Haplosoma abdominalis, Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. April 28th, 1901.
1. Mabek, Jalor. July 23rd, 1901.

59. Sastroides crassipalpis, Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. May 11th, 1901.

60. Caritheca 4-pustulata, Baly

4. Bukit Besar, Nawngchik. 2,500 feet. May, August, 1901.
1. Telôm, Perak-Pahang boundary. 4,000 feet. January 18th, 1902.

61. Antipha abdominalis, Jac.

1. Gedong, South Perak. January 7th, 1902.

62. Antipha fulvofrontalis, Jac., var.

1. Bukit Besar, Nawngchik. 2,300 feet. May 7th, 1901.

63. Antipha, sp.

1. Bukit Besar, Nawngchik. 2,500 to 3,500 feet. April 29th, 1901.

64. Antipha nigra, Alld.

1. Bukit Besar, Nawngchik. 2,500 feet. May 5th, 1901.

65. Malacosoma flaviventre, Motsch.

1. Patani. April 18th, 1901.
4. Biserat, Jalor. October, 1901.

66. Japhinella nigripennis, Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. April 28th, 1901.
1. Biserat, Jalor. July 9th, 1901.

67. Mimastra annandalei, Jac. (sp. nov.)

1. Bukit Besar, Nawngchik. 2,500 feet. May 7th, 1901.
1. Ban Sai Kau, Nawngchik. May, 1901.

68. Mimastra sumatrensis, Jac.

Semangko Pass, Selangor-Pahang boundary. 3,500 feet. May 11th, 1902.

69. Macrima fuscolineata, Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. April 30th, 1901.
1. Kuala Mabek, Jalor. July 24th, 1901.

70. Cerophysa siamensis, Jac. (sp. nov.)

1. Biserat, Jalor. October, 1901.

71. Cerophysa sumatrensis, Jac.

1. Telôm, Perak-Pahang boundary. 4,000 feet. January 18th, 1902.

72. Cerophysa, sp.

1. Biserat, Jalor. October 18th, 1901.

73. **Aenidia laeta,** Baly.

1. ? . Siamese States.

74. **Monolepta basalis,** Jac.

3. Bukit Besar, Nawngchik. 2,500 feet. April and August, 1901.

75. **Monolepta signata,** Oliv.

1. Patani. April 18th, 1901.
1. K. Anak Bukit, Nawngchik. April 24th, 1901.

76. **Monolepta rufipennis,** Jac.

1. Gedong, South Perak. January, 1902.

77. **Monolepta rubricollis,** Jac. (sp. nov.)

1. Telôm, Perak-Pahang boundary. 3,500 feet. January 26th, 1902.

78, 79, 80. **Monolepta,** spp.

3. Biserat, Jalor.
1. Gedong, South Perak.

81. **Haplosonyx albicornis,** Wied.

1. Telôm, Perak-Pahang boundary. 3,500 feet. January 17, 1902.

82. **Haplosonyx batuensis,** Jac.

1. Bukit Besar, Nawngchik. 2,500 feet. September 9th, 1901.

83. **Haplosonyx robinsoni,** Jac. (sp. nov.)

5. Bukit Besar, Nawngchik. 2,500 feet. May and August, 1901.
1. Jor, South Perak. 2,000 feet. January 28th, 1902.

84. **Sermyloides basalis,** Jac.

10. Bukit Besar, Nawngchik. 2,500 feet. April to August, 1901.

'Taken on the wing at dusk and after sunset several times.'

85. **Sermyloides basalis,** Jac., var.

3. Bukit Besar, Nawngchik. 2,500 feet. April to August, 1901.
3. Jeram Kawan, South Perak. February 12th to 13th, 1902.

86. **Ochralea nigripes,** Oliv.

1. Biserat, Jalor. July 4th, 1901.

87. Sumatrasia unicolor, Jac.

1. Telôm, Perak-Pahang boundary. 3,500 feet. January 25th, 1902.

88. Batusia pallidicornis, Baly

1. Semangko Pass, Selangor-Pahang boundary. 3,000 feet. May 15th, 1902.

89. Ozomena nigricollis, Jac.

3. Bukit Besar, Nawngchik. 2,500 feet. May to September, 1901.
1. Kuala Mabek, Jalor. July, 1901.
2. Gedong, South Perak. January 7th, 1902.

90. Ozomena impressa, Fabr.

1. Gedong, South Perak. January 7th, 1902.

91. Apophylia pallipes, Jac.

2. Bukit Besar, Nawngchik. 2,500 feet. April 28th, 1901.
1. Biserat, Jalor. July 15th, 1901.

LIST OF SPECIES IDENTIFIED

Sagrinae

Sagra peteli, Lac.

Criocerinae

Lema cyanea, Fabr.
„ *coromandeliana*, Lac.
„ *striatopunctata*, Lac.
Crioceris impressa, Fab.
„ *semipunctata*, Fab.
„ 4-*pustulata*, Lac.

Clythrinae

Tituboea laportei, Baly
Aspidolopha buguetti, Lac.

Cryptocephalinae

Melixanthus bimaculicollis, Jac.
„ *siamensis*, sp. nov.
Cryptocephalus birmanicus, Jac.

Eumolpinae

Aoria bowringi, Baly
Nodostoma aeneipenne, Motsch.
„ *frontale*, Baly
Cleorina aulica. Lefèv.
„ *metallica*, Lefèv.
Colasposoma mutabile, Baly
Colaspoides laportei, Baly
„ *siamensis*, sp. nov.
„ *annandalei*, sp. nov.
Corynodes nitidus, Fab.
„ *mouhoti*, Baly
„ *gibbifrons*, Lefèv.

Chrysomelinae

Agasta formosa, Hope.

Halticinae

Sphaerometopa nigricollis, Jac.
Sebaethe bipustulata, Jac.
„ *sumatrana*, Jac.
„ *lusca*, Fab.
Euphitrea wallacei, Baly
Acrocrypta fraterna, Jac.
„ *dimidiata*, Baly
Hyphasis fulvicornis, sp. nov.
Podontia 14-*punctata*, Lac.
„ *affinis*, Grönd.
Simaethea laportei, Baly
Sphaeroderma parvula, Jac.
Notomela apicipennis, sp. nov.
Irisotra gemella, Erichs

Galerucinae

Oides pectoralis, Clark
Aulacophora rosea, Fab.
„ *coffeae*, Normst.
„ *palliata*, Fab.
„ *denticornis*, Fab.
„ *intermedia*, Jac.
„ *lewisi*, Baly
„ *foveicollis*, Küst.
Pseudocophora buguetti, Guer.
„ *sumatrana*, Jac.
„ *basalis*, Jac.
Haplosomoides plicata, Alld.
Haplosoma abdominalis, Jac.
Sastroides crassipalpis, Jac.
Caritheca 4-*pustulata*, Baly
Antipha abdominalis, Jac.
„ *fulvofrontalis*, Jac.
„ *nigra*, Alld.
Malacosoma flaviventre, Motsch.
Japhinella nigripennis, Jac.
Mimastra annandalei, sp. nov.
„ *sumatrensis*, Jac.
Macrima fuscolineata, Jac.
Cerophysa siamensis, sp. nov.
Aenidea laeta, Baly
Termyloides basalis, Jac.
Cerophysa sumatrensis, Jac.
Monolepta basalis, Jac.
„ *signata*, Oliv.
„ *rufipennis*, Jac.
„ *rubricollis*, sp. nov
Haplosonyx albicornis, Wied.
„ *batuensis*, Jac.
„ *robinsoni*, sp. nov.
Ochralea nigripes, Oliv.
Sumatrasia unicolor, Jac.
Batusia pallidicornis, Baly
Ozomena nigricollis, Jac.
„ *impressa*, Fab.
Apophyllia pallipes, Jac.

DESCRIPTIONS OF NEW MALAYAN AND ONE BORNEAN SPECIES OF PHYTOPHAGOUS COLEOPTERA

BY

M. JACOBY, F.E.S.

DESCRIPTIONS OF NEW MALAYAN AND ONE BORNEAN SPECIES OF PHYTOPHAGOUS COLEOPTERA

BY M. JACOBY, F.E.S.

'IN the absence of Mr. ROBINSON and myself in Selangor and Calcutta, respectively, Professor POULTON has kindly superintended the publication of these diagnoses. Mr. JACOBY's full paper on the Phytophaga collected will be published later, with the collectors' field notes.'—N.A., INDIAN MUSEUM, CALCUTTA.

Melixanthus siamensis, sp. nov.

Black, thorax impunctate, elytra finely punctate-striate, black, a sinuate transverse band at the base, and a round spot near the apex, bright flavous.

Var. Abdomen partly fulvous.

Length, 2½ mm.

Short and broad, the head rather strongly and closely punctured, antennae black, with the apical six joints strongly dilated, the lower three joints flavous, thorax strongly convex, widened at the middle, black, very shining, the lateral margins feebly rounded, posterior angles acute, produced, medial lobe biemarginate, with a short transverse depression, the surface impunctate, scutellum black, trigonate, elytra very finely punctate-striate, the punctures nearly absent below the middle, the interstices, with a row of still finer punctures here and there, the black ground colour divided by a bright yellow transverse band at the base, which does not extend to the suture, and is strongly constricted at the middle, another round yellow spot of rather large size is placed near the apex, under side and legs black, abdomen (in one specimen) as well as the pygidium fulvous; prosternum about as long as broad, widened posteriorly, the basal margin straight.

Habitat. Biserat, Jalor, Siamese Malay States.

Separated by the black thorax, and the design of the elytra from its congeners.

Colaspoides annandalei, sp. nov.

Fulvous, the apical joints of the antennae, the breast and the legs black, thorax strongly punctured, elytra closely punctate-striate, not depressed below the base, abdomen fulvous.

Length, 5-5½ mm.

Head extremely finely and sparingly punctured, clypeus not separated from the face, except at the sides, transverse, sparingly punctured at the base, antennae fulvous, the terminal six joints black, widened, thorax strongly transverse, the sides feebly rounded, the surface strongly but not closely punctured, except at the sides, where the punctuation is stronger than at the disc, and more closely placed, elytra not wider at the base than the thorax, rather strongly punctured in closely approached rows, below and the legs black, the femora unarmed, abdomen fulvous.

Habitat. Bukit Besar. 3,000 to 3,500 feet. Jungle. 5th May, 1901.

Of this species, well-distinguished by its colouration from other Eastern *Colaspoides*, two apparently female specimens were obtained.

Colaspoides siamensis, sp. nov.

Cupreous or greenish, the antennae and legs fulvous, under side nearly black, thorax subremotely punctured on the disc, elytra deeply and closely punctate-striate at the inner dise, the sides coarsely punctured and the interstices strongly confluently rugose, femora unarmed.

Length, 4-4½ mm.

Head impunctate at the vertex, the middle with a fovea, epistome subquadrate, separated from the face by lateral grooves, supra-ocular sulci distinct, clypeus with some distinct punctures, its anterior margin nearly straight, labrum fulvous, antennae long and slender, fulvous, the terminal three joints piceous, third and two following joints equal, thorax not more than twice as broad as long, narrowed anteriorly, the sides feebly rounded, the disc rather strongly and subremotely punctured, the sides more closely so, scutellum impunctate, broad, elytra not depressed below the base, strongly punctured in semiregular rows at the inner disc, the sides much more coarsely so and the interstices at the same place strongly transversely and confluently convex, below bluish-black, the last abdominal segment fulvous at the apex.

Habitat. Biserat, Jalor. Jungle. 4th July, 1901.

There are a good many Eastern species of *Colaspoides* known which seem closely allied to the present insect, this may however be separated by the colour of the antennae and legs, in connexion with the unarmed femora, the strongly punctured thorax and its shape and the nearly black under side ; the two specimens before me seem to represent the male sex.

Hyphasis fulvicornis, sp. nov.

Flavous or fulvous, thorax impunctate, sides strongly rounded, elytra extremely minutely punctured, widened at the middle.

Length, 5 mm.

Head impunctate, frontal elevations broad, strongly raised, carina acute, elongate, antennae extending to the middle of the elytra, fulvous, the basal joint elongate, thickened, third joint slightly shorter than the fourth, terminal joints elongate, thorax strongly transverse, more than twice as broad as long, the lateral margins strongly rounded, sides narrowly flattened and reflexed, the surface impunctate, with a slight depression in front of the scutellum ; elytra widened towards the middle, microscopically punctured, metatarsus of the posterior legs as long as the following two joints, claws strongly swollen.

Habitat. K. Mabek, Jalor (Robinson and Annandale), also Perak (my collection.)

Closely allied to several other Eastern species, but differing principally in the entirely fulvous antennae, from *H. indica*, Baly, in the much smaller size and colour of the elytra, from *H. unicolor*, Jac., in the rounded shape of the sides of the thorax and the absence of any punctuation of the latter. *H. femoralis*, Jac., has distinctly punctured elytra.

Notomela apicipennis, sp. nov.

Subquadrately ovate, fulvous, the apical joints of the antennae black, thorax transverse, finely punctured, elytra regularly punctate-striate, metallic blue, the apex fulvous.

Length, 4 mm.

Head fulvous, impunctate, obliquely grooved in front of the eyes, frontal elevations absent, clypeus broad, antennae widely separated, extending beyond the base of the elytra, the lower five joints fulvous, the rest black, third joint slightly longer than the fourth, this and the following joints nearly equal, thorax more than twice as broad as long, the sides rounded, anterior angles thickened, scarcely produced, the surface transversely convex, finely punctured, median lobe broad, feebly produced, scutellum small, fulvous, elytra convex, regularly and finely punctate-striate, the interstices very minutely punctured, shoulders somewhat prominent, the last row of punctures deeper than the others, extreme apex fulvous, the rest of the surface metallic blue, under side and legs fulvous, prosternum very narrow, mesosternum short and transverse, its base emarginate to receive the apex of the metasternum, posterior femora strongly incrassate, their tibiae widened and sulcate at the apex only, armed with a spur like the intermediate ones, metatarsus as long as the following two joints together, claws appendiculate, anterior coxal cavities closed.

Habitat. On 23rd April Mr. Annandale and Mr. Robinson were at Patani Town, on the 26th at Ban Sai Kau. Three specimens bear the date 24th April, 1901.

This genus has been described by me from an African species (*Proc. Zool. Soc.*, 1900) with which the Siamese insect agrees so closely that I cannot well separate it generically; the only difference may be found in the shape of the mesosternum which, in the present species, is of much more transverse and short shape than in its African congener, in which the apex of this part is rather strongly bilobed, on that account the insect may, perhaps, claim the rank of a generic separation if other species so structured should turn up. In general appearance *Notomela* resembles a species of *Chrysomela*, notably the the Australian genus *Calomela* (Australica).

Taphinella nigripennis, Jac.

The specimens contained in this collection differ from the type, originally described from Burmah (*Ann. Mus. Gensa*, 1889), in having black tibiae and tarsi, but this is the only difference of any importance I can find. *Taphinella* is distinguished by the very short second and third joint of the antennae, and the following five or six strongly dilated joints in the male; the thorax is transverse, of equal width, the tibiae are unarmed, the claws appendiculate, and the anterior coxal cavities are closed.

Oorophysa siamensis, sp. nov.

Fulvous, antennae and tarsi black, thorax deeply transversely sulcate, elytra obscure flavous, the sutural and lateral margins narrowly piceous.

Length, 4 mm.

Narrow and elongate, the head impunctate, fulvous, very shining, frontal elevations feebly raised, rather broad, antennae black, the basal joint fulvous, second one shorter than the third, the fourth and following joints subquadrately widened, short, thorax subquadrate, scarcely broader than long, the sides feebly rounded at the middle, the disc deeply transversely sulcate, the sulcus not extending to the sides, impunctate, fulvous, scutellum triangular, fulvous, elytra wider at the base than the thorax, scarcely perceptibly and sparingly punctured, obscure flavous, the sutural and lateral margins obscure piceous, the apex sometimes of the same colour, below and the legs obscure fulvous, the apex of the tibiae and the tarsi blackish.

Habitat. Biserat, Jalor, Siamese Native States.

A small species of which two, apparently female specimens, are before me; the insect is allied to *C. nigricornis*, Jac., from India, but is much smaller, and differs in the colouration of the elytra and legs; the male has probably one or other of the joints of the antennae enlarged.

Haplosonyx batuensis, Jac.

The two specimens contained in this collection differ from the type in having flavous antennae with the exception of the first three joints which are black, the amount of purplish colour at the basal portion of the elytra is also rather larger, but there are no other differences whatever between the two forms which are evidently subject to a good deal of variation in regard to colours. Another closely allied species found in Borneo, of which I give the description here, is contained in my collection.

Haplosonyx shelfordi, sp. nov.

Black, the antennae, apex of the tibiae and the tarsi flavous, thorax rather remotely punctured, deeply transversely sulcate, elytra fulvous, the basal portion black, finely and very closely punctured, abdomen fulvous.

Length, 9 mm.

Head black, impunctate, labrum and palpi flavous, the penultimate joint of the latter strongly inflated, antennae flavous, the second and third joint very short, the fourth very elongate, thorax more than twice as broad as long, the sides straight, the surface deeply transversely sulcate, rather strongly but not very closely punctured, scutellum pointed, black, the extreme apex flavous, elytra very closely and finely punctured, the basal third in shape of a transverse band black, the rest dark fulvous, the breast and legs black, the apex of the tibiae and the tarsi as well as the abdomen flavous.

Habitat. Borneo (Shelford).

Almost similarly coloured to *H. batuensis* but much larger, the elytral punctuation much finer, the colour of the antennae and legs different.

Haplosonyx robinsoni, sp. nov.

Broad and robust, pale flavous, the legs partly or entirely black, thorax with a few fine punctures, transversely sulcate at the sides, elytra with indistinct and widely-placed rows of larger punctures, the interstices closely and more finely punctured.

Var. The antennae with the fourth and fifth and the apical two joints more or less blackish.

Length, 11-13 mm.

Head entirely impunctate, with a short longitudinal groove above the antennae, clypeus convex, triangular, apex of the mandibles black, antennae not extending to the middle of the elytra, the second and third joint short, subequal, the fourth longer than the fifth joint, thorax twice and a half broader than long, the sides subangulately widened before the middle, posterior angles produced outwards, the surface with a few minute punctures at the basal portion, deeply transversely sulcate at each side, scutellum pointed, triangular, elytra with a short, rather shallow depression below the base, with double rows of distinctly placed larger punctures, the interstices everywhere closely and finely punctured, legs black, the under part of the femora often flavous.

Habitat. Bukit Besar, Nawngchik. 2,500 feet, and Tor.

Allied to *H. fraternus* (Duviv.) from Java, but with flavous not black under side, the antennae shorter and more robust, the scutellum flavous, and the elytral punctuation quite different; ten specimens were obtained.

Mimastra annandalei, sp. nov.

Head, antennae, and thorax flavous, elytra metallic dark green, closely punctured and finely rugose, the breast, abdomen, and the tibiae and tarsi black, femora flavous.

Length, 8 mm.

Head impunctate, flavous, clypeus broad, trigonate, impunctate, antennae extending to the end of the elytra, flavous, the terminal two joints more or less fuscous, third joint one-half shorter than the fourth, second joint short, thorax one-half broader than long, subquadrate, the sides straight, the surface transversely sulcate, impunctate, flavous, scutellum flavous, elytra very closely punctured and finely rugose, upper portion of the breast and the femora (their apex excepted) flavous, rest of the under side black.

Habitat. Bukit Besar, Nawngchick, and Ban Sai Kau. 2,500 feet.

Closely allied to *M. rugosa*, Jac., from Java, but with flavous antennae and black breast, also of rather shorter and broader shape.

Monolepta rubricollis, sp. nov.

Flavous, lower joints of the antennae black, head and thorax rufous, the latter transversely impressed, elytra minutely punctured.

Length, 4 mm.

Head impunctate, rufous, deeply transversely grooved between the eyes, the latter very large, clypeus wedge-shaped, labrum flavous, antennae very slender, nearly extending to the apex of the elytra, black, the ninth and tenth joint more or less flavous, the third joint twice as long as the second one, thorax one-half broader than long, the sides straight, the posterior margin rounded, the surface with a rather deep transverse depression at each side, impunctate, rufous, very shining, scutellum flavous, elytra nearly parallel and sub-cylindrical, very finely and closely punctured, flavous, their epipleurae indistinct below the middle, below and the legs flavous, the latter very slender, the metatarsus of the posterior legs very elongate.

Habitat. Telom, South Perak. 4,000 feet. Two specimens.

This *Monolepta* is of rather slender shape, and may be known by the red colour of the head and thorax

FASCICULI MALAYENSES

ANTHROPOLOGICAL AND ZOOLOGICAL RESULTS OF AN EXPEDITION
TO PERAK AND THE SIAMESE MALAY STATES, 1901-1902

UNDERTAKEN BY
NELSON ANNANDALE AND HERBERT C. ROBINSON
UNDER THE AUSPICES OF THE UNIVERSITY OF EDINBURGH AND
THE UNIVERSITY OF LIVERPOOL

ODONATA
PART II

BY
F. F. LAIDLAW, M.A. AND DR. F. FÖRSTER

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REPORT ON THE DRAGON FLIES. II

THE LEGIONS PLATYCNEMIS AND PROTONEURA

By F. F. LAIDLAW, M.A.

WITH NOTES ON SOME MALAYAN SPECIES

By Dr. F. FÖRSTER

THANKS to Dr. FÖRSTER's kindness I am able to add to my account of these species some very interesting notes written by him, as well as descriptions of new species and subspecies in his collection.

Of these notes I have translated some (printed here between square brackets). These deal with species already described; whilst his descriptions of new species or subspecies, as well as a review of certain species belonging to the genus *Disparoneura*, I have left unaltered in German.

The two accounts add considerably to what is known of the distribution of these forms in the peninsula, whilst Mr. ANNANDALE's field-notes are especially welcome because of the accurate dates given, and also because they supply information, to some extent, as to the colours of the living animal.

I hope to deal with some points in connection with the geographical distribution of these species later when I am able to deal with the Odonate fauna as a whole. But I wish now to call attention to a recent paper by M. MARTIN on the Odonata of Indo-China [: 04], which adds very largely to our knowledge of the distribution of the Odonates of the Oriental region, and shows that Indo-China is surprisingly rich, especially in members of the Calopteryginae. Thus he records no fewer than three species of *Dysphaea* from Tonkin, as well as a large new species of *Echo*, and also *Tetraneura argyroides*. The genus *Micromerus* appears to be absent, but *Libellago asiatica* is noted as having been taken in Tonkin. WILLIAMSON's paper also (see below) gives much interesting information.

The following is a list of recent papers on the Odonata of the Oriental region, some of which are referred to in the following papers :—

'86. DE SELYS LONGCHAMPS. Revision du Synopsis des Agrionines Mem. Couronnées de l'Acad. Roy. de Belgiques T. xxxviii, 1886.
'98. KRUGER, L. Die Odonaten von Sumatra. Agrioninae. Stett. entomol. Zeit., 1898, pp. 90-139.
: 02. LAIDLAW, F. F. Skeat Expedition, Odonata, Part II. P.Z.S., 1902, pp. 351-389.
: 04. MARTIN, R. Mission Pavie, Zoologie. Liste des Neuroptères de l' Indo Chine.
: 04a. WILLIAMSON, E. B. Dragon flies [Odonata] of Burma and Lower Siam. 1. Subfamily Calopteryginae. *Proc. U.S. Nat. Mus.* xxviii, pp. 165-187, 1904.

Species not in Messrs. ANNANDALE and ROBINSON's collection are marked with an asterisk.

F. F. LAIDLAW

LEGION PLATYCNEMIS

Trichocnemis renifera. Selys (race ?)

1 ♂, 3 ♀. Bukit Besar. 2,500 feet.

The male and two females were taken in May, the third female, which is very immature, in August. Unfortunately, the head of the male specimen has been damaged. This sex has not been fully described so far as I am aware. DE SELYS ['86] merely remarks that it differs from *T. didyma* chiefly in size and in having more extensive black marks on the head. The following are some other features distinguishing the present specimen from the male of *T. didyma*. The anal appendages are black; the upper pair are rather longer than the lower, and are provided with a small ventral sub-median tooth; their distal ends are widened dorso-ventrally. The lower pair are directed upwards, and at their extremities are hooked downwards. The black line at the second lateral thoracic suture is not continued down to the second femur.

The females tally closely with that described by DE SELYS (*loc. cit.*) from Darjiling so far as the head and thorax are concerned, but differ in having the tenth abdominal segment entirely black; whilst apically on segments eight and nine, which are also black, there is a dorsal, crescent-shaped, yellow mark.

Length of abdomen, ♂, 45 mm.; ♀, 40 mm.
Length of hind wing, ♂, 26 mm.; ♀, 27 mm.

This species has very recently been recorded from Tonkin by M. MARTIN [:04].

It is evidently closely related to the next form. The chief differences are in size, this species having its wings considerably smaller; and in the colouration of the thorax of the male. The large spherical mark on either side of the middle line should serve to distinguish it when contrasted with the 'keilförmiger Fleck' of *T. orang*. Also the legs of the male have their lateral surfaces yellowish excepting for the tarsi which are all brownish-black.

Trichocnemis orang.* Förster n. sp.

Gehört zur Gruppe der Platycnemis mit nicht gezahnten Flügelrande und langem Sector inferior trianguli, bei welcher die vordere Seite des Vierseits kaum zwei Drittel so lang ist als die hintere. Sie unterscheidet sich von den kleinen Arten dieser Gattung wie folgt: Flügel deutlich vor der basalen Submedianquerader 'gestielt,' der Sector inferior trianguli vor dieser Querader entspringend. Vielleicht bildet sie mit den Species der II Abteilung (nach DE SELYS. *T. didyma*) eine besondere Gruppe.

Statur wie *Argiolestes* oder *Wahnesia*. Flügel kurz gestielt, d.h. sie fangen schon etwa 1/5 mm. vor der basalen Submedianquerader an sich zu

verbreitern. Der Postcostalraum nur eine Zelle breit (einzellig). Der Sector medianus entspringt 1/5 mm. vor der Nodalquerader im Niveau des Nodus, der Subnodalsector aus der Nodalquerader. Die vordere Seite des Vierseits nicht ganz zwei Drittel der hintern, die innere Seite fast rechtwinkelig auf der hintern, etwas länger als die Hälfte der vordern. Erste Querader des Postcostalraumes etwas vor der Verlängerung der Aussenseite des Vierseits gelegen. Pterostigma breit, rhomboidal, ein und ein Drittel mal so lang als breit, 1½ zellen lang, schwarz oder dunkelbraun. Der Nodus ungefahr am Ende des basalen Flügeldrittels gelegen. Der Nodalsector entspringt in der Flügelmitte oder etwas (bis zu 3 zellen) vor derselben, der ultranodalis 3-5 zellen nach hm. 18-19 Postnodalqueradern. Keine Hilfssectoren vorhanden. Kopt gross, Brust kräftig, das Abdomen schlank unbekert, um etwa ein Fünftel langer als die Flügel, beim ♂ an Basis und Ende etwas verdickt, beim ♀ am Ende (Segment 8-10) etwas angeschwollen. Das neunte segment oben gewölbt, ohne Langsrinne.

♂ (adult). Abdomen 46 mm. lang, Hinterflügel 33 mm. lang, in der Mitte 5½ mm. breit, 5 mm. lang gestielt. Pterostigma schwarz, $\frac{5}{4}$ mm. lang, ½ mm. breit. Geäder schwarz, die basale Submedianquerader ungëfahr in der Mitte zwischen der ersten und zweiten Antenodalquerader gelegen, kaum merklich naher der zweiten. Körper kräftig. Kopf bis 6 mm. breit. Thorax vorn an der Basis 3 mm. breit. Kopf mattschwarz, die Oberlippe und das Rhinarium glänzend schwarz, letzeres mit einem Punkteindruck jederseits der Mitte. Fühler schwarz, das Endglied sehr fein und lang. Ocellen braunrot. Dicht an der Hinterhaupts kante, parallel derselben und nahe dem Augenrand jederseits ein gelber strich. Prothorax mit flachbogigem Hinterrand, vorderer und hinterer Teil matt schwarz, Mittelstück glänzend schwarz.

Thorax mattschwarz. Ein grosser keilförmiger silberfarbener Fleck jederseits der Mitte nimmt fast die ganze Vorderseite ein. Derselbe ist im Leben veilleicht silberblau oder weissblau, ebenso eine schmale Interalarbinde der Thoraxseiten. Unterseite des Thorax weisslich-gelb, an den Hüften und nahe dem Hinterrande schwarzlich. Interalarflecken gelblich. Beine und Wimpern tief schwarz.

Beim Abdomen ist das zehnte Segment fast halb so lang als das neunte. Die obern Appendices so lang als das 10 Segment, von oben gesehen platt, lanzettförmig, braunrot mit schwarzer Basis. Nahe der letzeren auf der Unterseite ein feiner kurzer Zahn, ebenso am Ende des zweiten Drittels ein Zahn, welcher so stark ist als das Ende des Appendix und dabei etwas länger. Beide Zahne sind gerade und stehen senkrecht nach unten ab. Untere Anhange fadenförmig, $\frac{5}{4}$ so lang als die obern, dabei höchstens ein Fünftel so dick, erst etwas nach aussen und in die Höhe, dann zangenförmig nach innen gebogen braunrot, am Ende schwärzlich, in der Form mit den kleinen *Trichocnemis* übereinstimmend. Segment 9 unten jederseits der Mitte mit einen nach hinten gerichteten scharfen zahn versehen. Tibien nicht verbreitert.

♀ adult. Abdomen 43 mm., Hinterflügel 32 mm. lang, in der Mitte gemessen 5½ mm. breit.

Pterostigma dunkelbraun. Kopf wie beim ♂ aber die Oberlippe mit einer Längsfurche, ihre Seitenecken und der Raum zwischen ihr und der Augen *gelb*. Ausserdem jederseits eine wellige gelbe Linie hinter der Fühlerbasis schräg gegen das hinterste Ocellum. Prothorax wie beim ♂, aber ein grosser runder Fleck auf dem Mittelstuck jederseits der Mitte und ein kleiner Doppelfleck in der obern Hinterecke blassgelb.

Am Thorax statt dem Keilfleck eine schmale blassblaue Antehumeralbinde. Hinterecken und Underseite des Thorax ganz blassgelb. Abdomen schwarz. Das 10 Segment höchstens ein Drittel so lang als das neunte, mit zwei geraden schmal kegelförmigen Appendices von der halben Länge des 10 Segmentes. Rinne das zehnte Segment kaum uberragend, am Ende zwei fadenförmige Anhänge von der Länge der Appendices, mit schwach löffelartig verbreiterten Enden.

Ein dreieckiges eingesenktes von schwarzem Wullstrande umgebenes Feld auf Segment I, sowie die Seiten und die Unterseite dieses Segmentes blassgelb, ebenso ein gelber Strich auf der ersten Hälfte von Segment 2. Hintere Hälfte von Segment 8 und 9 himmelblau. Appendices braunschwarz. Die Unterseite besonders an den Artikulationen und längs der Seitenkante ausgedehnter gelb als beim ♂. Beine mässig lang, blassgelb, die Aussenkante schwarz, die Tarsen ganz schwarz. Wimpern der Tibien etwa dreimal so lang als ihr Abstand. Klauenzahn unterhalb der Spitze, klein.

Die Unterlippe ist bei beiden Geschlechtern bis zu etwa ⅛ ihrer Länge rechteckig ausgeschnitten.

Vorkommen. Camp Jor auf der Wasserscheide zwischen Pahang und Perak, 2,000 f. Ein Parchen in Coll. Foerster (Albert Grubauer).

Tr. orang ist wohl die grösste Form der Selys-schen Legio Platychemis.

Trichocnemis octogesima. Selys.

5 ♂. 2,000-2,500 feet. Bukit Besar. April, May, and September.

'*Colour.*—Thorax sky-blue and black; abdomen black with blue tip.' All these specimens agree exactly enough with the type described by de Selys, but in all of them the median sector originates *before the level of the nodal vein.* I have not been able to examine any authentic examples of this species, but as

I can find no other character to separate the specimens before me from that described by DE SELYS I think the safer course to pursue is to refer them to his species, especially as it is known to occur in the Peninsula.

Recorded from Sumatra, Borneo, the Peninsula, Annam, and Cambodia.

Trichocnemis octogesima albicauda.* Förster.

(Octogesima de Selys, Rasse albicauda F.)

♂. Abdomen 34 mm. lang, Hinterflügel 22 mm., seine Breite bis 4 mm. Pterostigma fast rhombisch, schwarz, am Ende heller. Der Sector medianus entspringt an der Nodalquerader, der Sector subnodalis ⅓ *Zellänge* hernach. Sector inferior trianguli bei der basalen Submedianquerader entspringend, die erste Postnodalquerader aus der Aussenseite des Vierseits. Der Nodalsector entspringt ungefähr in der Mitte zwischen Nodus udd Pterostigma, der Ultranodalis 3 Zellen hernach.

Kopf. Oberlippe und Rhinarium glänzend schwarz, der übrige Teil matteschwarz. Blassblau sind : der Vorderrand des Rhinarium, eine wellige, in der Mitte unterbrochene Linie an der Sturmbasis und am Augenrande sowie ein Punkt jederseits des untersten Ocellum, ebenso ein länglich runder Postocularfleck, der einen ebensolchen Flecken auf den Seiten des Hinterhauptes berührt. Prothorax schwarz mit Ausnahme eines grösseren unregelmässigen Flecks vorn am Seitenrand des drittelstückes der schrag gegen die Mitte laüft. Hinterrand halbkreisförmig.

Thorax schwarz. Ein nierenförmiger grosser Fleck jederseits der Basis, darüber in der Höhe des Antealarsinus ein kurzer Längsstrich Silberblau. Blau ist ausserdem eine Interalarbinde der Thoraxseiten und der ganz hintere Teil der Seiten von der zweiten schwarzen Seitennaht ab. Underseite des Thorax weissgelb, ebenso das ganze erste Segment des Abdomens, abgesehen von einem schwarzen medianen, nach hinten etwas verschmälertem Längsband der Oberseite. Ubrige Segmente schwarz. Auf Segment 2 in der vordern Hälfte ein elfenbeingelber Langsstrich, der die Basis nicht erreicht, alsdann bei Beginn des letzen Drittels jederseits ein punktformiger Lunularfleck von der gleichen Farbe.

Die beiden Lunularfleck erscheinen auch auf den Segmenten 3-6, rücken aber nach hinten zu dem Segmentende immer näher, dabei kleiner verdend, bis sie auf Segment 7 ganz erloschen sind. Basis von Segment 3 mit zwei kleinen weissgelben Punkten. Hinterecken des 10 Segmentes schräg abgeschnitten elfenbeingelb, ebenso die Appendices anales weisslichgelb. Unterseite weisslich, an der Artukulationen schwarz geringelt, das 7 Segment unten etwas dunkler als die übrigen.

Unterlippe ebenfalls weisslich, Beine weissgelb, die Kanten schwarz liniert.

Appendices anales: Die obern von oben gesehen flach lanzettlich, reichlich so lang als Segment 10, von der Seite gesehen messerformig. Untere Appendices in der basalen Hälfte breit lanzettlich, dann plotzlich verjüngt, die endhälfte fadenförmig, scherenförmig nach innen gebogen. Am Ende der Verbreiterung auf der Innenecke ein kleines braunes Höckerzähnchen, der ganze Anhang kaum merklich länger als der obere.

Vorkommen: Camp Jor, auf der Wasserscheide zwischen Pahang und Perak, 2,000 Fusz hoch. 1 ♂ (ALBERT GRUBAUER) in Coll. FOERSTER.

DE SELYS hat zwar das ♀ der Tr. octogesima von Singapore beschrieben, aber als zu *octogesima*, gehörendes ♂ eine Trichocnemis von Borneo, vermutllich eine Lokalrasse der Sumatra form.

Von der Type unterscheidet sich *albicauda* durch die nicht länglich ovalen, sondern breit nierenförmigen Flecken der Thoraxbasis. Das neunte Segment der Type ist in der hintern Halfte blau, das zehnte ganz blau, die Appendices anales dunkel mit einem starken medianen zahn der Unterseite.

Das typische *octogesima* ♂ von Singapore ist noch nicht bekannt. *Albicauda* dürfte eine verdüsterte Hochgebirgsrasse der *octogesima* von Singapore sein.

The specimens that I have referred to *T. octogesima* are, I think, quite distinct from this 'race,' and save in the neuration resemble DE SELYS type where they differ from *albicauda*.

Trichocnemis borneensis.* Selys.

I take this opportunity of describing certain specimens collected by myself at Kwala Aring in Kelantan, in September, 1899, which with some hesitation I refer to this species. Of these there are four females and one male, the latter taken in copula with one of the females.

The females resemble that described by DE SELYS ['86], but the markings on the head, thorax, and prothorax described as blue in his specimen are dull orange-yellow in these, whilst the juxta-humeral band is practically of equal breadth throughout and reaches to the antealar sinus.

Length of abdomen, 35 mm.
Length of hind-wing, 22 mm.

The male has the head colour pattern similar to that of the female, but the yellow is replaced by blue and the black ground is rather more extensive. The prothorax is black with a small blue mark on either side of the median lobe. The thorax is largely black with a pair of small diamond-shaped blue marks on either side of the middle line in front; the upper pair much smaller than the lower. Sides of thorax black with a broad oblique blue band on either side; under surfaces yellowish-white. Abdomen obscure above with a black basal ring on each segment, save the first, which is yellow with a fine black dorsal line. Anal appendages whitish-brown, the upper pair slightly longer than the lower, with a slight ventral projection beyond their middle; lower pair nearly straight, slightly upturned at their ends. Legs yellowish-brown with a black line along the outer sides of the femurs and tibias. Pterostigma dark-brown with a pale margin.

Length of abdomen, 37 mm.
Length of hind-wing, 22 mm.

Trichocnemis membranipes.* (Ramb.)

I have not seen examples of this species from the Peninsula. It ranges from Tonkin to Java, Borneo, Sumatra.

Genus Psilocnemis. *de Selys.*

Copera, Kirby.

[In my collection two forms of this genus occur. The first has the upper anal appendages of the male very short; the end of the eighth and the ninth and tenth abdominal segments white, rather more obscure than in the Java type. This specimen comes from Sumatra and is *Psilocnemis marginipes* (RAMB.) = *Psilocnemis lobimargo* of KRUGER, or if it is to be distinguished from the Javanese type = *Psilocnemis marginipes lobimargo*, KRUGER ['98].

The second form has the upper appendages only one-half as long as the lower and only the tenth segment white. This is *Psilocnemis vittata*, DE SELYS, from Malacca. This type, *Psilocnemis vittata vittata*, DE SELYS, includes three well-marked races, namely, *Psilocnemis vittata imbricata*, HAGEN (found in Padang in Sumatra, synonymous with *Psilocnemis acutimargo*, KRUGER), also *Psilocnemis vittata serapica*, HAGEN, from the Nicobars, and *Psilocnemis vittata atomaria*, DE SELYS, from Borneo.

A point that appears to me to have escaped the notice of other observers is that the females of the *vittata* group are dimorphic. There exist evidently two forms of the female. One of these (ab. *lacteola* DE SELYS) is white, and has, when adult, white tibias. The second is a *virago* form, coloured like the male, and also like the male it has yellow tibias. I possess *virago* forms belonging to the vittata group, the *marginipes* group appears only to have the white form of female. Young males of *marginipes* resemble this *lacteola* form. It is to be hoped that those who have an opportunity of examining more abundant 'material' than is in my possession will give attention to this interesting subject].

Oopera marginipes, (Ramb.)

2 ♂, 6 ♀.

These specimens undoubtedly belong to the *marginipes* group. The upper anal appendages of the male are very short. The end of segment eight and segments nine and ten are white, or bluish-white. Five of the females are of the *lacteola* type, but the sixth, fortunately taken *in copula* with one of the males at Mabek in July, is certainly a *virago* form. The remaining five females, all of which seem immature, are of the white *lacteola* form. One female is from Jarum, the rest from Mabek. Are the white females merely immature specimens ? The male is described as follows :—' Head and thorax velvety black, marked with pale emerald-green ; abdomen very dark grey with pale blue tip, and rings of the same colour at the joints. Legs canary-coloured, very conspicuous in flight.' The female taken with the male is coloured much the same save that the pale blue and emerald-green markings are replaced by dirty white.

If the white females are immature forms it is curious that so many more of them should have been secured.

Oopera atomaria.* Selys.

Kelantan (Laidlaw : 02)

Oopera ciliata. Selys.

One male of this very handsome species from Gedong, Batang Padang, Perak, taken in January. It agrees closely with a male from Sumatra described by Selys ['86], but is a trifle larger. Abdomen, 34 mm. ; hind-wing, 18 mm. The epistome is white, and the rest of the head is perhaps best described as whitish-yellow with the vertex in the neighbourhood of the ocelli black, with also two large black marks a little behind these and to the sides of them ; from these black marks an extension runs back to the black post-ocular spaces. Thorax very dark-brown, with two paler lateral bands on either side. Abdominal segments nine and ten blue, the upper pair of anal appendages yellowish-white, conical, directed rather upwards, as long as the tenth segment ; lower pair twice as long, curved downwards at their extremities, their distal halves black. Legs white, with black spines and tarsi ; the two hinder pairs of tibias dilated. Articulations of femurs and tibias black.

LEGION PROTONEURA

Protosticta foersteri.* Laidlaw [:02]

♂ adult.

[Abdomen, 38 mm., hind-wing, 17½ mm. Neuration as in the female.

Head dull black, the basal two-thirds of the rhinarium shining, the rest of the rhinarium and the upper lip pale yellow—a little bluish. Extreme border of upper lip brown. The two basal segments of the antennae pale-brown, the rest darker. Ocellae pale-brown. Prothorax yellow-brown, with four oval black spots, two lying transversely on the anterior border, and two longitudinally on either side of the middle line of the middle part of the prothorax. Hinder border slightly arched ; sides a little dilated, transparent.

Thorax purple-brown, somewhat metallic, especially the median carina, which is also darker, as is a stripe along the first lateral suture. Sides paler brown, almost yellow posteriorly, the second suture darker.

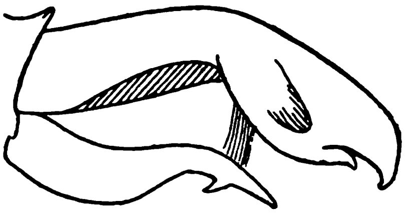

Fig. 1.

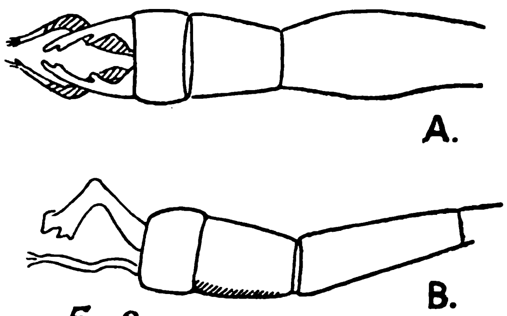

Fig. 2.

Abdomen thin, graceful ; black in colour, a ring on the base of segments three to six, and the whole of the ninth segment pale ivory yellow. The first part of segments three to five, the middle of segment two, and almost the whole of the first segment pale brown. Segments eight and ten black. On the ventral side the pale brown parts of the dorsal surface are also ivory-yellow. Hinder margins of the sides and lower margin of the ninth segment black.

Length of segments—	1.	·75 mm.
	2.	1· mm.
	3-5.	6·5--7 mm.
	7.	5 mm.
	8.	1·25 mm.
	9.	·75 mm.
	10.	a little less than ·5 mm.

Anal appendages (see text and Fig. 2 *A. B.*) somewhat similar to those of *Platysticta quadrata.* The under pair are fully 1 mm. long, the upper a little longer;

both pairs dull black. Seen from above the upper pair are shaped like a pair of pincers, broadest at their bases, bending inwards and becoming narrow towards their tips ; on the inner side, at about the middle of the basal third of their length is a rectangular bending ; in the middle of the second third the bending is less marked ; the terminal third with the bend hardly marked and the apex pointed. Lower appendages rather longer than the upper pair, thread-like (fadenförmig). Their first half with a remarkable twisting from below, upwards and outwards ; then at the middle they turn inwards at an obtuse angle, the knee of the angle being rather thickened. The terminal half is thin, thread-like and straight, terminating in a small bundle of yellowish bristle-like hairs. Seen from the side the upper appendages are first directed upwards, then bent at a right angle downwards ; a yellow knob lies on the upper side of the knee. The end is somewhat hatchet-shaped and slightly forked. The under appendages are wider in a horizontal plane, but seen in profile they are straight and thread-like. One male, Camp Jor, 2,000 feet.]

Platysticta quadrata. Selys.

2 ♂, 2 ♀. Bukit Besar. 2,500 feet. April and May.

Colour of the male.—'Thorax black and pale green (on sides). Abdomen black with brilliant turquoise blue spots on the upper surface, corresponding to the yellowish markings on ventral surface.' The female is coloured exactly as the male save that segments eight to ten of the abdomen are black, with a lateral blue mark on segments eight and nine.

Anal appendages of the male. The upper pair each carry a curious brush-like structure on their inner surface, which projects inwards and downwards. The lower pair have about three-fourths of the length of the upper pair and each carry at the commencement of the terminal third of their length a strong inwardly directed tooth (see text, fig. 1).

[A large male from Kelantan collected by WATERSTRADT. Length of abdomen with appendages 40 mm., of hind-wing 29 mm.].

Platysticta sharpi, Laidlaw sp. n.

2 ♀, 1 ♂ (teneral). Bukit Besar. 2,500 feet. May.
1 ♀. Upper Padang, Perak. January.

Allied to *P. sundana*, KRUGER ['98], from Sumatra and Java, but distinguished by the much less prominent projections of its prothorax. In fact, this species appears to be intermediate to some extent between typical members of the group of *P. quadrata* on the one hand, and *P. balterata* and *P. sundana* on the other.

The median sector arises beyond the level of the vein descending from the nodus, the sub-nodal sector still further beyond this. Post-nodal nerves eleven to fourteen, usually twelve. The head of the male is much shrivelled ; in the females the upper lip is black with a pair of ill-defined bluish marks near its base ; rhinarium pale blue, the rest of the head black except the labium and under-surface which is yellow.

Prothorax pale yellow, the hinder lobe steely-black. In the male the posterior lateral angles of this lobe are almost squared and project slightly outwards and backwards. In the female these angles are produced into a short outwardly projecting spur on either side, which, like the lobe itself, are of a steely-black colour. Thorax black on the dorsal side, this colour extends laterally as far as the humeral suture ; the sides are a pale-yellow, with an oblique wedge-shaped mark on the first lateral suture, its apex directed downwards, not reaching to the base of the legs.

Abdomen dark brownish-black. The first segment is yellow with a dark apical ring in the male. Segments two to seven each with a basal ring of pale yellow and an apical ring of jet black. Segments eight to ten short, sub-equal dark-brown.

The above description applies equally to either sex apart from the distinctions noted.

In the older of the two females, that from Bukit Besar, the light and dark basal and apical rings extend only to the fifth segment.

Length of abdomen ♂, 42 mm. ; of hind-wing, 23 mm.
" " ♀, 34 mm. ; " " 24 mm.

The disproportionate length of the abdomen of the male is no doubt due to the fact that it has been subjected to some pressure in packing, and to its very delicate state.

The anal appendages are much shrivelled, so that it is not possible to describe them ; the lower pair appear to resemble those of *P. quadrata.*

Disparoneura analis.* de Selys.

Two adult males from Kwala Kangsar, Perak (Coll. Förster).

Disparoneura notostigma. de Selys.

De Selys versuchte zuerst seine beiden Gattungen *Disparoneura* und *Alloneura* (*Caconeura*, Kirby) dadurch zu trennen, dass er den ächten Disparoneuren getrennte Sectores arculi zuschrieb, seinen Caconeuren an der Basis ein Stück weit verschmolzene Sectores arculi.

Später (Revision des Agrionines) empfiehlt er, alles zu *Disparoneura* zu stellen, was wenigstens noch ein Rudiment des Sector inferior trianguli

aufzuweisen vermag, zu *Caconeura* aber diejenigen Arten, bei welchen auch die letzte Spur des Sector inferior trianguli verschwunden ist.

Wenn nun etwas das ineinander Uberzehen der Selysschen Untergattungen *Disparoneura* und *Alloneura* nachzuweisen vermag, so sind es die blau gezeichneten Disparoneuren von Malakka.

In 'Synopsis des Agrionines' (1860) beschreibt de Selys eine ächte *Disparoneura*, die blau und schwarz gezeichnete *Disparoneura notostigma*. Das Pterostigma ist 1½–2 Zellen lang, der Sector inferior trianguli rudimentär und bildet nur noch eine Randzelle. (Bei einer Art dieser Gruppe fehlt in einen Flügel auch diese Randzelle, das betreffende Specimen ist also im auf der einen Seite eine *Disparoneura*, auf der andern eine *Alloneura* (*Caconeura*, Kirby)). Es liegen von Malakka 3 schwarz und blau gezeichnete Protoneuren vor, namlich die ächte *Disparoneura notostigma*, de Selys, und zwei weitere Formen, welche zweifellos Rassen der notostigma sind, aber nach der Einteilung de Sely's in die Untergettung *Alloneura* gestellt werden müssten, wenn letztere sich aufrecht erhalten liesse.

Diese 3 Formen seien hier kurz charakterisiert.

Disparoneura notostigma notostigma. (de Selys)

Rudiment des Sector inferior trianguli als Marginalzelle vorwanden. Der Sector Superior trianguli geht im Vorderflügel 3 Zellängen über das Vierseit hinaus. Oberlippe blau. Neuntes und zehntes Segment wohl auch blau obwohl de Selys sagt 'obscur' Prothorax schwarz, ein breites Seitenband blau. Ein Antehumeralbandes Thorax an der Basis breit blau, nach oben zugespitzt. Zwei gründlichblaue Seiten-binden.

Auf dem zweiten Abdominal segment ein schmal oblonger blauer Fleck, im Ubrigen abdomen u. appendices schwarz.

Vorkommen : Mount Ophir (Wallace).

In Mr. Annandale's collection there is a pair of this species from Sungkei, dated February, 1902.

Disparoneura notostigma laidlawii.* Förster, n. sbsp.
(Oaconeura, Kirby)

♂. Keine spur eines Sector inferior trianguli. Der Sector superior trianguli laüft 3-5 Zellen über des Vierseit hinaus. Gesicht schwarz, auch die Oberlippe, das Feld zu beiden Seiten der letzeren bis zum Augenrand hellblau. Stirnband blau wie bei *notostigma*, nur in der Mitte von einem halbkreis formigen schwarzen Fleck, auf welchem die Ocellen stehen, unterbrochen. Prothorax und Thorax schwarz. Vom Seitenrande des Prothorax laüft eine schmale tiefblaue Binde auf den Thorax über, wo sie sich bis zum Niveau des Antealar sinus als Antehumeral binde fortsetzt. Sie ist ungefähr ein Achtel so breit als das schwarze Mittelfeld der Vorderzeite des Thorax und gegen das obere ende zu etwas verschmalert. Die hintern zwei Drittel der Thoraxseiten fast ganz blau, das blaue Feld durch eine schmale schwarze Binde halbiert. Vor der Binde ist es dunkelblau, hinter derselben weisslichblau. Interalarflecken blau. Auf segment 2 ein blauer medianer Längs strich, auf Segment 3-6 an der Basis jederseits zwei kleine blaue Punkte. Segment 8-10 sowie die obern Appendices himmelblau. Unterer Anhang schwarz. Sonst wie notostigma. Sehr charakteristisch ist die Form der Appendices anales, die jedenfalls das einzige Mittel an die Hand gibt, die Rassen des *notostigma*—Typus zusammenzufinden. Obere Appendices von oben gesehen kurz saülenförmig zugespitzt, gerade, während die untern mit feinen zangenartig nach innen gebogenen Enden die obern überragen. Das Ende der untern Appendices knöpfchenartig verbreitet. Von der Seite gesehen sind beide Anhänge schmal dreieckig, schräg nach unten hängend, die obern, kürzern mit beilförmigen Enden.

♀. Der Hinterrand des Prothorax in der Mitte sonderbar eingeschnitten und ausgehöhlt. Die Vorderecken dieser Aushöhlung stehen als kleine Zähnchen ab. Jederseits der Aushohlung besitzt der Rand drei weitere kleine Zähnchen, von welchen das mittlere blau ist. Unterhalb der Ocellen ein blaues fast gerades Stirnband. Seiten des Thorax schwarz bis auf eine blaue Interalarbinde. Gelb sind : die Thorax-Unterseite, die hintere Hälfte der Unterlippe und das Feld zwischen Oberlippe und Augenrand, sowie ein Fleck auf der Seite des ersten Segmentes.

Der Sector superior trianguli geht im Vorderflügel nur eine Zelle über das Vierseit hinaus, im Hinterflügel dagegen drei Zellen. Bei einem ♀ sind die blauen Zeichnungen alle hellgelb.

Vorkommen: Camp Jor, auf der Wasserscheide zwischen Pahang und Perak, in einer Hohe von 2,000 Fusz (ALBERT GRUBAUER leg).

Disparoneura notostigma collaris.* (de Selys)

♂. Prothorax auch am Hinterrande mit breiter hellblauer Binde. Die blaue Antehumeralbinde sehr breit, unten so breit als das schwarz Mittelfeld der Thorax vor derseite oben breit ist, oder noch etwas breiter. Auf der Seite dagegen die schwarz Interalarbinde breiter als die beiden blauen Antehumeralbinden. Unter und obere appendices anales blau. Keine Spur eines Sector inferior trianguli (DE SELYS sagt dass bei seiner Type im einen Flügel eine Marginalzelle vorkomme). Der Sector superior trianguli im Vorderflügel eine Zelle länger als das Vierseit, im Hinterflugel drei Zellen länger. Sonst wie *Laidlawii.*

Stimmt besser mit dem Typus *notostigma* überein als *Laidlawii*, ist aber eine Caconeurenform und hat die Oberlippe schwarz. Form der Appendices anales wie bei *Laidlawii* beschrieben; doch miterscheidet letzere Art der in der dritte schwarze Prothorax-Hinterrand.

Vorkommen: Malakka (DE SELYS) Kwala Kangsar, Perak, ein ♂ in Coll· FOERSTER.

Bei Vergleich drei *Notostigma* formen fallt sofort in die Augen, dass das Klein geäder selbst beiden Individuen einer Species variabel sein kann, und daher nur mit grosser Vorsicht zu Gattungs—oder gar Familien diagnosen herbeigezogen werden darf, letzeres uberhaupt erst dann, wenn wir den ganzen Verlauf individueller und specieller Variabilität einmal genauer kennen.

Disparoneura verticalis. de Selys

Ahnlich wie bei *D. notostigma* verhält es sich mit *D. verticalis*, DE SELYS. Es sind drei Disparoneuren-Formen mit schwarzer Korperfärbung und roten Zeichnungen beschrieben, welche alle nur Subrassen eines Typus darstellen. Da eine davon Malakka bewohnt, mogen sie hier kurz charakterisirt sein.

Disparoneura verticalis verticalis.* de Selys

♂. Oberlippe und Band am Epistom rot. Ein rotes Stirnband, Prothorax mit rotem Seitenrand. Breite rote Antehumeralbinde.

Vorkommen: Borneo.

Disparoneura verticalis delia.* (Karsch)

♂. Stirn mit rotem Band. Der Prothorax jederseits mit einem grossen roten Punktfleck, sein Hinterrand schwarz. Die rote Antehumeralbinde schmal, die Thoraxmitte kaum erreichend. Schenkel schwarz, nahe dem obern Ende blutrot geringelt.

Vorkommen: Sumatra, Karsch (Coll. MARTIN).

Diese Rasse besitze ich auch von *Java*, die beiden roten Punkte des Prothorax sind aber sehr klein.

Disparoneura verticalis humeralis.* (de Selys)

♂. Kopt ganz schwarz. Prothorax wie bei der Java-form mit einem *kleinen* roten Seitenpunkt. Eine feine rote Antehumeralbinde, die nicht ganz bis zum Antealarsinus hinauf reicht. Die vordere helle Seitenbinde des Thorax ist bei gut erhaltenen Stücken schön blutrot, die hintere weisslich. Schenkel nur auf der Innenseite deutlicher rot geringelt.

Vorkommen: Malakka (WALLACE), Camp Jor auf der Wasserscheide zwischen Pahang und Perak (ALBERT GRUBAUER).

Var nigra.

Ohne rote Antehumeralbinde. Prothorax ganz schwarz. Camp Jor, Coll. FOERSTER.

Sind die Appendices anales mit der Basis dem Abdomenende angedrückt, so erscheinen sie, wie sie DE SELYS beschriebt, etwas abgehoben aber fast mit beilartig nach unten verbreiterter Basis. Das ♀ der *humeralis* ist ausserst ähnlich dem ♀ der *D. Laidlawii*, doch ist die Oberlippe gelb und besitzt des Gesicht ausser der Stirnbinde noch eine zweite gelbe uber das Rhinarium laufende Querbinde. Die feine gelbe Antehumeralbinde reicht bis zum Antealarsinus. Marginalzelle im Hinterflügel sehr klein. Sector superior trianguli im Vorderflügel 3, im Hinterflügel 4½ Zellen lang.

Ein reicheres Material wird zeigen, ob sich die drei Rassen *verticalis detia* und *humeralis* an allen Orten werden auseinander halten lassen, da sowohl die Ausdehnung der roten Färbung als auch die Länge der Sectores trianguli individuell varirt.

Disparoneura interrupta.* (de Selys)

Sumatra, Singapore.

Caconeura gracillima.* (de Selys) ?

Perak.

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